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COTTON BAGGING.

Last month a conference was held in the rooms of the railroad commission at the State House, Atlanta, Ga., upon the invitation of the commission, of those directly and indirectly interested in the baling of cotton from the time it leaves the hands of the planter till it reaches its destination at the factory. It was expressive of the earnest desire of the commission to improve the merchantable condition of the cotton bale with special reference to its transportation by the railroads from the time it comes into their possession, though the discussion took a wider range.

The question of the proper baling or covering of cotton has been discussed in all of its phases from the time the staple became an important product of commerce, yet no great improvements have been made, nor are they likely to be made within the immediate future. It will take further time before any appreciable effect is seen in the present system of preparing cotton for marketing as a result of the bitter criticisms that are now so universally made against it wherever it manifests itself. Notwithstanding its condemnation from every one who has to do with it, in all parts of the cotton manufacturing world, there is no immediate evidence that it will soon be discarded for something better.

IMPROVEMENTS ARE IN PROGRESS.

Improvements will undoubtedly be made, and some are already in progress, but they can not be regarded more than a leaven of what may develop affecting the whole system. The agitation of this question at the Atlanta conference of cotton growers and cotton spinners last October has not yet wrought the needed reformation, but it brought those most vitally concerned in its success in harmonious touch with one another, and set them to thinking; and when a body of intelligent men engaged in the same or related vocations start to thinking in agreement something to their advantage is sure to follow.

Whatever is planned or done, it should be remembered that no system that has been in vogue for half a century, affecting a trade and its ramifications upon which great industrial enterprises are dependent, can be changed or reformed at once, however feasible it may appear to a casual observer or might be if it pertained to only a small number of persons. When many people and interests are affected, all changes in trade methods become more or less complex, which, were they confined to individuals, might be simple and easily adjusted for immediate improvement. Habit has a great deal to do with methods, and when it becomes fixed upon a community it is extremely difficult to modify it, even for the better, and when a change is coupled with the elimination of invested capital the habit is inoculated with a fighting spirit for existence. Improvements, therefore, come slow and only as a result of well devised persistence, and effective when old ways and means become so disqualified as to admit of their introduction. Improvements become largely a matter of replacement rather than of demolition.

The American cotton bale is covered with a jute cloth, and its condemnation has been severe and almost universal. The anathema that is pronounced upon it is deserving, but

is it, of itself, wholly at fault? Spinners have stigmatized the whole system of cotton baling but they have taken no positive action that will force a reform where it is most needed. The spinners are the real ones that should institute and compel a change for the better. They have it in their power to do so if they will act in concert, which they should be able to do most effectually and expeditiously through their organizations.

DEMAND FOR CHEAP BAGGING.

There is better bagging material than that now in general use, such, for example, as is used for covering Egyptian cotton, but the present kind is miserable only in instances where its fiber and fabrication is wretched to meet a demand for something cheap; a demand that planters will make so long as they can do so without trade restraints, and in this respect planters are no different from those in other vocations. While efforts are being made to secure a better fabric in fiber and manufacture than that now employed, why not insist upon something better in that already in use? What guarantee is there to be had, should the cotton crop be baled in the Egyptian style of bagging, of the fabric not being cheapened by inferior material or slighted in manufacture? And if it were so cheapened, the trade would be in as grievous a state as it is to-day.

The bagging that is now employed for the American cotton crop is bad because it is not manufactured as it should be, and because a considerable portion of it is not new, or has been used one or more times for the same purpose and thus more or less dilapidated like the garment of a tramp. In fact much of the American cotton crop is clothed after the same fashion as that assumed by the proverbial tramp, who perhaps may have upon him a cloth once worn by a prince. There is a limitation to the very best of jute bagging, but the sight of some bales that are put on the market would give the impression that all planters do not think so. That bagging is bad because it is not manufactured as it should be, is not the fault of those manufacturing it so much as of those buying it, for so long as the latter insist upon something cheap they will get the article pure and simple.

IMPROVE THE BAGGING WE HAVE.

If there were a physical or moral power to compel the covering of cotton with a jute bagging the same as now used but better made in fiber and construction, there would be no great necessity for a change to the Egyptian style of bagging or anything else; but at the same time, and of equal importance, the same power should have the authority to compel the employment of new material and none other. If planters will wrap their cotton with six yards to the bale of good closely woven jute bagging, of good fiber, 45 inches wide and weighing two pounds to the yard, they will give to the trade a creditably protected package that will meet all requirements. This is a matter where improvement can be inaugurated with what we have, instead of trying to introduce something foreign though the latter may be favored. There is much to be said in behalf of the jute style of bagging that is now in use for its adaptability to the rough usage to which the bale is subject, but the length of this article precludes our arguing it at this time.

Observation tells us that there is a considerable quantity of second-hand jute cloth utilized for covering purposes, more than what may be thought necessary for patching. What this quantity is is a matter of conjecture, and by placing it at 5,000,000 yards, or enough to cover one bale in every fifteen of last year's crop, we do so as a rough though probably an approximate estimate. Assuming that 70,000,000 yards of jute cloth were required for last year's crop, and that 50,000,000 yards were new domestic goods as estimated for us by manufacturers, including re-manufactured stuff (trash at the best), and 15,000,000 yards were foreign cloth, as shown by customs statistics, we have a deficiency of 5,000,000 yards to be accounted for, which we have charged to second-hand bagging. If we had not the figures to the contrary we should have placed the consumption of second-hand material higher. All of the imported cloth may not have been taken by planters and much of it may still be in stock, but the probabilities are that they did take it, as the amount given above was withdrawn from bond or entered immediately into the channels of trade. More foreign bagging was used for the cotton crops of 1906 and 1907 than for any previous year in the history of the trade, or, for example, nearly four times as much as in 1900, and the prospects are that the crop of 1908 will be covered with the same kind of stuff as freely as was the case in the last two years, that is 2,700,000 bales will be protected by goods made abroad, much of which is composed of low-grade fiber such as can be obtained from jute sweepings and butts, and spun into threads of various sizes and complexions. In fact, even what is denominated new bagging may be nothing more than shoddy stuff, but little superior to some second-hand cloth.

SUBSTITUTE FOR JUTE BAGGING.

Incidentally we desire to allude to a scheme which the farmers' union of Mississippi is promoting of inducing its members to cover their cotton with bagging made of cotton, with the purpose of thus finding a market for the "low grades and dog tails." Advices from the officials of the union inform us that arrangements have been made with manufacturers for an ample supply of this cloth on a guaranteed basis for quality, which we are supposed to understand to mean something that will be of sufficient strength and durability to stand the rough usage to which the bale is put. We have not yet been favored with a sample of the cloth to enable us to have its tensile strength tested, nor the strength of its constituent threads, but we hope to be. We learn, however, that the cloth is to weigh 21 ounces to the yard, and that seven yards constitute a "pattern," or quantity required for one bale, to cost $1.19 per pattern, or 17 cents a yard. These are the figures given in the proposed contract of sale. We do not wish to say a word inimical to this scheme, for if there can be found a legitimate use for the low grades and dog tails in any cotton crop it is to be commended and encouraged. but the above cost alone of $1.19 a bale does not commend the material to the planter, who would thus be put to an expense greater than that which he would incur in the use of ordinary jute bagging, and we doubt if he would improve the protection of his cotton by the change. Here again is another example of making the baling cloth for cotton from low-down material, and expect it to come up to the standard of requirements.

SECOND HAND BAGGING.

How much second-hand bagging is used for patching there are no means by which it can be ascertained. It may be said that practically every compressed bale has one or more patches of different sizes according to the purpose for which they are put on, either to cover holes or increase the weight. We do not think so much of this kind of material

is imported as some seem disposed to believe. All such imports are subject to a duty of 10 per centum, as unenumerated articles, and the value of such articles imported in 1906-07 amounted only to $1,295.50; and even assuming the improbability of all this applying to this material, it would show a very small quantity. One must not possess the idea that much of this class of imports finds an entrance at our ports as refuse gunny bagging, or rags, to be converted into paper stock, and as such allowed to come in free of duty, for such is not the case. These imports are carefully scrutinized and are made dutiable as "selected sides" suitable for "patching or baling" cotton, and even when packages are entered "consisting of pieces of old cotton bagging unassorted and indiscriminately mixed, some of which is suitable for patching cotton" they are subject to a 10 per cent. duty in the unenumerated class. Hence, practically all of the patches used on cotton bales are from bagging thrown off at our own factories.

THE FORM OF THE BALE.

While we have had much to say about the material for covering the cotton bale, it should not be understood that if this were as it should be nothing more would be required to complete the bale as a presentable and merchantable package. Quite as important as the character of the covering is the manner of its adjustment on the bale, as well as the form of the latter. The cotton bale as it leaves the ginner's press is a fairly good looking rectangular package, and if it could be allowed to retain this form till it reaches the factory but very little complaint could be made concerning it in this particular. But such is not its destiny and instead it is crushed out of shape or semblance of its former self by the ponderous compress, and its bagging metamorphosed into a hideous condition that is a travesty on any intelligent system for marketing a product. Even if a bale should be covered with the very best material possible, it would still be an abomination to the eye if compressed as is now done. The only way to improve matters in this respect is to reform the final compression of the bale, and have it done with the cotton inclosed within a box in the same manner as is practiced at the ginnery.

TRADE OPPORTUNITIES IN SOUTH AMERICA.

We call attention to the address of Dr. Albert Hale, to be found elsewhere in this issue, made before the Georgia Industrial Association on the extension of foreign trade with the countries of South America, or Latin-America, including Mexico and the States of Central America. Accepting Dr. Hale's population estimate of 65,000,000 for all Latin-America, and deducting 17,000,000 as the population of Mexico and Central America, we have 48,000,000 for the States of South America with whom we should come into much closer commercial relations on both sides of the continent when the Isthmian canal is completed and open for trade.

In this population of practically 50,000,000 there is an immense opportunity for profitable commerce in the manufactures of the United States and in the natural products of South America. Of our total commerce with the world scarcely seven per cent. of it is with people to the south of us, which is a disparity that is explainable, but which should not exist, and would not if proper methods were employed to rectify it. We import nearly twice as much as we export. Our trade with Asiatic countries is considerably more than it is with our near neighbors with whom we are endeavoring to cultivate harmonious political relations with an expectation of deriving some commercial benefits therefrom, and which we can have in preference to those of other nations if we will only claim them by adapting our methods to the wishes and idiosyncrasies, it may be, of the people that are disposed to be our customers.

Less than an eighth of our export of cotton goods goes into our South American trade, while a much larger proportion can be had, and, in fact, is solicited if we will conform to the means of promoting trade that are adopted by the manufacturing nations of Europe. Nothing of more value to the commerce of the United States could be done than well directed endeavors by the International Bureau of the American Republics, with which Dr. Hale is connected, toward facilitating or pointing out feasible means for an extension of trade with the republics that are at our doors supplicating us to come into closer relations with them. If any section of this country is particularly concerned in any endeavor of this kind it is the Southern with its rapidly growing manufacturing industries, the foreign outlet for which is naturally, by almost territorial contiguity, in the marts of South America. This bureau has been in existence for eighteen years, and within this period the South American trade in the relative position of exports and imports has been going against us, notwithstanding this bureau has as one of its most important objects the development of commerce between the nations. Our imports exceed our exports more now than they did eighteen years ago. The percentage of our exports to South America to the total exports to all countries has not increased in the least within this time. The query arises, has the bureau fulfilled its mission as completely as it should have done, or what could have reasonably been expected of it?

The question of how to stimulate trade in the textile and other manufacturing industries, with South America, is an extremely important one, but of greater importance is the disposition of manufacturers to cultivate this trade with the necessary business spirit for its success. This spirit has not yet manifested itself to the same degree as is seen in that exhibited by the manufacturers of Europe. The reason is apparent in the fact that the American textile manufacturers, for example, have to themselves almost exclusively the best market in the world right about them, right at home, and the urgency of seeking a foreign outlet for their goods has not yet dawned on them with sufficient cogency for them to change their business methods and character of products to meet the peculiar conditions and wants of other people.

The people of the Latin-American countries are ready to give preference to the manufactures of the United States over those of European countries if trade facilities are made as favorable, and instead of supplying only 10 per cent. of the imports, as in the case of Chile, we might readily have 40 to 50 per cent. of them. Our goods are conceded to be the best, and their purchase is largely retarded by our unwillingness or lack of facilities for extending the required terms of credit. In Chile, and the same pertains to the other countries, there is an excellent opportunity for the sale of American cotton goods, and brown duck and the heavier weight of goods may be named. A business concern of Buenos Ayres, Argentina, has made it known to the American trade by advertising its want for one million yards of gray, bleached and black duck, per year, to weigh seven to twelve ounces per yard. This

concern says that "to do a successful business here the manufacturer has to send the samples (catalogues will not do), and sell at 90 days' sight draft." This advice should be familiar to our trade as it has been dwelt upon time and time again in the consular reports to our government.

Our trade with the South American republics is very seriously impeded by the inadequacy of direct steamship communication between their ports and those of ours. Our commercial interests recognize this, but it seems to be the consensus of opinion that the remedy for this state of affairs lies in the hands of Congress, before which it has been argued for so many years, without results, that the beginning has about passed remembrance. President Jeff Davis, of the Georgia Industrial Association, touched upon this phase in his annual address before this body consisting chiefly of cotton manufacturers, as noted elsewhere in this issue. There is no doubt of the need of better transportation facilities that will enable our manufacturers to dispose of their goods direct to the commercial port of the purchaser. As an example, that may be applicable to the whole southern continent, of the 2,000 ships that were entered and cleared at Buenos Ayres during the first ten months of 1907, all were foreign vessels except six small sailing crafts. The absence of vessels flying the American flag in the carrying trade is a noticeable feature of the oceanic commerce from Colombia to the southern extremities of Argentina and Chile. The South American trade can not be captured by American manufacturers until they take united action in demanding a policy on the part of the Federal government that will establish direct maritime relations with the southern republics, of a character that will meet trade conditions as effectually as is done by the nations of Europe.

ARBITRATION BETWEEN BUYER AND SELLER.

Below is a copy of a resolution and its working details as recently unanimously adopted by the Cotton Manufacturers' Association and by the Hard Yarn Spinners' Association, of North Carolina.

All of the associations in the South have been requested to adopt this resolution and to appoint arbitration committees from each of their organizations.

It is believed that as soon as this system becomes operative in good faith between the buyer and seller, that many, if not all, of the evils of unfair and unjust complaints, cancellations, hold-ups, etc., can be eliminated.

Resolved, That the recommendation of the President to appoint two arbitration committees, consisting of three members to each committee, to represent the cloth and yarn branches of our mills in the State, be adopted.

Working Details of the Resolution: B=Buyer or commission house. S=Seller or mill.

1st: B places an order with S, the delivery to be spot, weekly, monthly or otherwise, as may be agreed upon.

2nd: After delivery begins, for some cause, just or unjust, B makes a claim against S.

3rd: In the meantime S has bought cotton against the sale, and reclamation, cancellation, hold-up or lay-down will necessarily entail serious loss.

4th: B in the meantime insists upon his position and the result is a conflict and disagreement.

Our Position is to Submit to Arbitration: 1st: S will be represented by the arbitration committee of this association. B to appoint his arbitrators and in case of failure to agree, then these arbitrators select a third and the decision made is binding and must be accepted by S and B.

2nd: Immediately upon any complaint being made against S which S and B can not satisfactorily adjust, then S is to file his evidence in writing with the arbitration committee, and B, if he desires, is to do likewise. If, however, either decline to submit to the arbitration committee of this association, then arbitration, as above proposed, must be accepted by both.

3rd: If either should decline to arbitrate, then the decision will go by default and in favor of the one agreeing to accept arbitration.

4th: B has the same right to file complaint with the arbitration committee of this association against S that S has in the above to file against B.

5th: The loser in each arbitration to pay the expenses of the arbitration.

6th: A copy of all complaints filed shall be sent to *each member* of this association with a copy of the decision, and this to be used for future reference by the members of the association.

7th: Each member of the association will thus be advised of the nature of all complaints, who is the camplainant, decision by the arbitration committee, etc., while now, each member knows only of his own troubles and oftentimes must submit to unfair and unjust settlements.

8th: This method of settling differences is absolutely fair to the honest buyer and seller and will eliminate sooner or later the unfair and unbusinesslike methods of any mill, commission house or buyer.

Cloth	Yarn.
S. B. Tanner,	D. Y. Cooper,
Wm. Entwistle,	Jno. C. Rankin,
E. A. Smith,	W. E. Morton.

HONOR CONFERRED ON C. J. H. WOODBURY.

Dartmouth College conferred on C. J. H. Woodbury, at its commencement, June 24, the degree of Doctor of Science, this being the second time that he has received the same degree, the first being from Union College, New York, in 1906.

FALL RIVER TEXTILE SCHOOL.

At a meeting of the trustees of the Bradford-Durfee Textile School, Fall River, Mass., it was voted to authorize the executive committee to expend not more than $25,000 in building an addition to the school. The addition will be used to extend the equipment of mill machinery, especially the weaving department, which at present is overcrowded. At the same meeting the resignation of Arthur S. Phillips, as treasurer of the corporation was accepted, and Edward S. Adams was elected his successor.

There are in and around Barmen, Germany, some 80,000 braiding machines, with probably 3,000,000 braiding spindles. Of these machines it is estimated that between 8,000 and 10,000 are devoted to the specialty of Barmen lace.

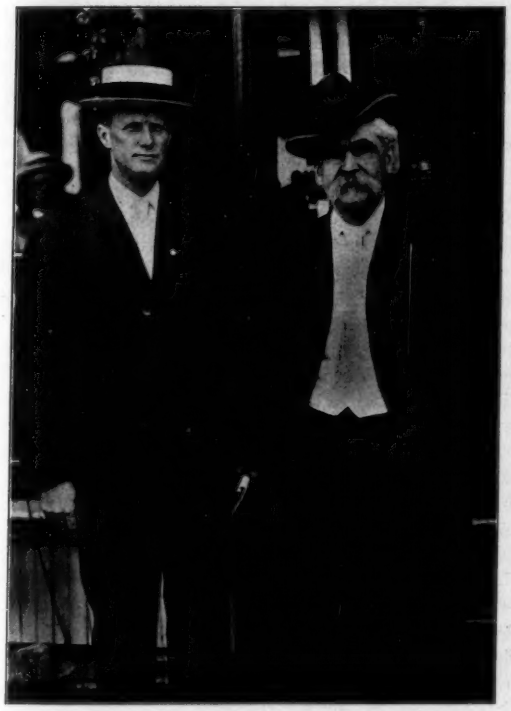
A particular but rather limited demand for a very harsh, indeed stiff, but lustered yarn is met in an interesting manner by so regulating the preliminary bleaching operation as to produce on the fiber a thin outside coating of oxycellulose.

GEORGIA INDUSTRIAL ASSOCIATION

The Georgia Industrial Association, composed chiefly of cotton manufacturers of Georgia, held its annual meeting in Atlanta the latter part of June.

The meeting was called to order by President Jeff Davis of Toccoa, who, after the transaction of some routine business, submitted his annual report which appears elsewhere in this issue, in which he discussed the industrial conditions generally, and the prospects for further industrial development in Georgia and the South.

Following President Davis, was an address by G. Gunby Jordan, of Columbus, who discussed most interestingly with a thorough conception of his subject, industrial education. Mr. Jordan's remarks may be found elsewhere in this issue, and are deserving of careful perusal.



JEFF DAVIS AND G. GUNBY JORDAN.

Dr. Albert Hale of Washington, D. C., representing Secretary of State, Elihu Root, and the International Bureau of the American Republics then addressed the meeting, an abstract of his remarks being as follows:

"I wish to keep your interest for the examination of certain trade conditions and opportunities. The population of Latin-America is 65,000,000, of the United States 85,000,000. The foreign commerce of the twenty-one republics amounted last year to over $5,000,000,000. The United States, of course, controlled the major part, but it is surprising to note that the Latin-American republics' share was nearly one-third of this total, or a sum of $2,000,000,000.

"A commerical field of this magnitude, and one in its infancy, as it were, must attract the attention of enterprising men like yourselves. Last year the United States bought and sold in dealing with Latin-America products to the value of $600,000,000. This is a commendable total, yet it should be larger. We must build it up to $1,000,000,000, and we can do so by applying to this field the same energy and interest we give to Europe and Asia.

"But let us study the cotton markets and consumption of South America. In one year Latin-America imported from the entire world $100,000,000 worth of cotton manufactures, of which the United States contributed only $10,000,000, a goodly part of the remainder going from England and Germany. Argentina imported $27,288,498 worth of cotton goods in 1907, but only $388,885 of this came from the United States. Brazil in 1906 imported $18,000,000 of cotton, but only $625,000 of this came from the United States. Chile imported $10,000,000 of cotton, of which the United States contributed $170,000. Peru, which is a cotton country, imported $3,250,000 worth of cotton, but only $125,000 from the United States.

"I might go on with the trade reports of other countries, but it would avail you little to hear dry figures. The main point to be emphasized is that South America is an immense field for commercial expansion; that it must no longer be neglected, because financially, socially and in population every republic is growing into full industrial importance, developing a consuming power which, if we do not recognize at once, Europe, with maturer experience in the problems of export trade, will so occupy as to leave no room for our influences.

"It needs watchfulness, alertness and aggressiveness on your part not to let the chance slip by. I am pleased to say, although you already are aware of the fact, that the department of commerce and labor has now an expert cotton man traveling in the interests of the cotton grower and manufacturer of the United States; he has been through Europe and parts of Asia; he is prepared to go to South America, and the department will gladly consider suggestions and inquiries coming from such a representative body as this association.

"My third topic is to be the international bureau of the American republics. This is the only institution of its kind in the world. It is officially, by the governmental decree of the twenty-one republics of the Western Hemisphere, devoted to the promotion of commerce and friendship between these independent nations. Founded eighteen years ago, and quietly collecting material for the work, it is now starting out upon a new life. Its object is to promote better relations and closer acquaintance between these republics, and to develop commerce and trade by all commendable means. It has published hand books, pamphlets and maps; it is the agency as well as custodian of archives of the international American conferences; it attends to correspondence and furnishes statistical data concerning all matters relating not only to Latin-America, but to the United States also. It publishes a monthly bulletin, giving the latest information in regard to commerce, new enterprises and general development of each republic."

The following resolution was offered and adopted, urging all cotton mills in the association to curtail production for at least four weeks by September 1.

"Whereas, It is the sense of this association, representing 2,000,000 spindles, that it is impossible to purchase cot-

ton at prevailing prices and manufacture the same into any product which can be sold for a price that will not involve loss; and,

"Whereas, The information furnished this meeting by its members from all parts of Georgia and as to the cotton belt satisfies us that only Providential interference can prevent a bumper cotton crop; it is, therefore,

"Resolved, That all mills in this association be and they are urged to curtail production to the extent of stopping an aggregate of four weeks by September 1, in order to prevent injury and disaster at a later date."

The following were elected officers of the association for the ensuing year: Dr. Jeff Davis, president, Toccoa, Ga.; H. P. Meikleham, vice-president, Lindale, Ga., and Chas. D. Tuller, secretary and treasurer, Atlanta, Ga.

The following committees were appointed: Executive Committee—J. P. Verdery, Chairman, Augusta; J. L. Hand, Pelham; W. J. Kincaid, Griffin; Fuller E. Callaway, LaGrange; E. A. Copeland, Greensboro; Dr. Jeff Davis, Toccoa, and H. P. Meikleham, Lindale. Legislative Committee—S. C. Dunlap, Gainesville; H. L. Johnston, Palmetto; S. A. Carter, Atlanta; F. B. Gordon, Columbus, and F. E. Callaway, LaGrange.

INDUSTRIAL CONDITIONS.

THE MOST VARIABLE YEAR IN THE HISTORY OF THE ORGANIZATION. LABOR EXACTING AND ARROGANT. UNREASONABLE DIVIDENDS PAID. NOT A QUESTION OF PROFIT BUT OF SURVIVAL. THE BUSINESS PANIC SHOULD BE A LESSON. CAPITAL SHOULD BE LIBERALLY TREATED. BENEFITS OF A PROTECTIVE TARIFF.

Annual Address of President Jeff Davis before the Georgia Industrial Association.

The year, upon which I am now called to report has perhaps, commercially and industrially, been the most variable one in the history of this organization. During the first half of 1907 we were literally deluged with an unprecedented prosperity. Every mill was on full time with plenty of orders bearing large profits. Mill building and improvements were in evidence on every hand. This wave of prosperity included all classes of society; capital was not without its profit, and labor reaped an abundant reward. Money for development, construction, and operating was easy to get at reasonable rates; capital was seeking investment, and an inviting hand was held out by our matchless resources. There was only one obstacle in the way, and that was the seeming scarcity of labor. It was easier to get money, with which to build a mill than to get labor to operate it. Everyone willing to work had regular employment at the highest prices known to the cotton mill industry. Under these circumstances there is small wonder that mill managers became imprudent and extravagant, or that labor should grow exacting and arrogant. In some instances, the contest for labor was so great that unreasonable wages were promised, and all kinds of inducements, fair and unfair, were used to get operatives to leave one mill and go to another.

The help on the other hand failed utterly to profit by the good fortune which had befallen them. Bewildered and intoxicated by the great demand, in which they found themselves, they would refuse to work full time, many of them being satisfied with two or three days per week. Inducements were held out from every direction, and many of them spent their time and their money on the railroads, seeking the supply depot at the foot of the rainbow. As a result of this demoralization, the lack of sympathy between employer and employee, production fell very short in every mill in Georgia, and that too at a time when production was most to be desired. The help, feeling secure in their employment, spent their money freely, and the mills put their profits in improvements and additions, and in some instances paid unreasonable and unbusinesslike dividends.

Neither arranged for the proverbial rainy day, which came suddenly and without warning, and these good times and good conditions were completely reversed. The mills were without orders, and labor was no longer in demand. With the mills it was no longer a question of profits but of survival. The mill help, no longer able to continue their migrating habits, began to appreciate their condition, and were now willing to work in one place, and put in full time. And right there a valuable lesson was learned by the mills. What had seemed a large labor shortage was in fact no shortage at all. It was now proved that there was in Georgia enough labor for all the mills, the whole trouble had been that it had not been kept busy, and that the mill managements had played no small part in the cause. These experiences will not be easily forgotten, and it is hoped that in the future they will prove valuable to both employer and employee.

The panic of 1907-08 was a severe one, and there is hardly a mill in the South which did not sustain severe losses, and the fact that all came safely through it is a living tribute to our financial institutions, and evidences the firm foundation of Southern cotton mills. While conditions are improved, the necessity for further curtailment is urgent.

And now no more of the panic, but, remembering its experiences, and profiting by its many valuable lessons, let us at this meeting band ourselves together, not to regain our former position, but to make a new one worthy of you and our great State.

In natural resources and industrial advantages, Georgia is second to no State in the Union, but we are backward in development. Georgia has nine times the area of Massachusetts, while Massachusetts manufactures nine times as many goods as we do. But this fact should bring no shame to us, as our environments have been so different. In the early history of the United States the South led in manufacturing. Then the institution of slavery made of us almost a purely agricultural people, selling all of our cotton in the raw, fighting a protective tariff and demanding free trade.

Then came secession, and we were devastated by war, and humiliated by reconstruction. So it can be seen that there are causes for our slow industrial development. But now various kinds of industrial enterprises are springing up all over the State. We are rapidly changing from an agricultural population to a people of varied pusuits. The many benefits of the home cotton mill are becoming better understood and more appreciated. The farmer has seen it steadily raise the price of his cotton, and furnish good markets for his perishable produce.

Electrical transmission has increased and advertised the value of our water powers, and our people are aroused to the importance of industrial and technical training. All of

these things point unerringly the course of a great development wave, which is now starting over Georgia. Our water powers will be developed, and mills will be built and operated, but the advantages and profits to Georgia will largely depend upon the political attitude of our people. Let me give an instance: Along the upper Savannah River over one hundred thousand horse-power is going to waste. The development of this enormous dormant asset of the State is now beginning, and the place of its application is a live question demanding our attention. Here is enough power to run forty 50,000 spindle mills. South Carolina is wide-awake to this opportunity. If Georgia would utilize for herself this enormous property, she must observe fair and liberal treatment of capital invested within the State.

We have seen the East grow rich and powerful under a protective tariff, while we, vainly fighting and refusing to participate in its benefits, have stayed behind in the great industrial procession. If the South would climb to the exalted position to which she is by nature designed, she will increase the number and variety of her manufactured products, spinning higher numbers and making finer goods, and will exchange an obsolete sentiment for sound business judgment.

The cotton goods now being manufactured in Georgia average very coarse, and are too near the raw material. A bale of cotton shipped out of the State brings a return of $50.00, manufactured into goods we now make, it brings $70.00. Widen the difference between the value of raw cotton, and the manufactured product, and you increase your chances of profit, and continually add to the assets of the State by furnishing lucrative employment to skilled labor, but this skill is in a large measure to yet be created. To this end, and to increase the earning capacity of labor, we should encourage and aid in the promotion of industrial education.

Much has been said about the extension of our trade limits, and the opening of the market of the world to our manufactured goods. This is a good move, and one in which the State Department at Washington has done much valuable work. This is especially true with our sister republics to the south. But, first of all, transportation must be provided for. At present, the world's systems of transportation are operated against America's manufactured goods. Subsidized ships come and take away our raw cotton, but we must pay full freight on our manufactured goods, and to a foreigner at that. America has no ships.

INDUSTRIAL EDUCATION.

Finished Product of the Human Genus. Columbus, Ga., Only City in the United States That Has A Secondary Industrial School. Six Weeks Practical Work Must Precede Graduation.

Abstract of Address by G. Gunby Jordan, Columbus, Ga., Before the Georgia Industrial Association.

The Americans never have sufficiently appreciated the finished product of humankind. We have been slow in this, and possibly slower in it than in anything else that the American people ever undertook to develop. We understand what it is to make a finished product in goods, and in rails, and in transportation, and in law, but we have never understood what it is to make the finished product of the human genus in that principle and part of our daily life, which is the most essential for our ultimate best prosperity; that is, in industrial education. Hon. Joseph Chamberlain in speeches he made in England a few years ago brought home very forcibly to the English mind the fact as to what England was doing. He said she was sending out less goods than she formerly did, but more real men, and that she was sending these men, these finished men, these men who would make their impress upon the world out to English colonies, and that these English colonies would ultimately eclipse the Mother Country in their movement toward industrial prosperity, from the very fact that they had the men who were capable of doing it.

Germany has taken the lead in all the world, taken the lead on account of the fact that she found herself seriously handicapped in that England and France and other countries were doing what she did not do—produce the manufactured articles, the things, that claim the trade of the world. And so Germany with that thorough-going spirit, that is so characteristic of her, went to work first to teach her boys and her girls exactly what to do in industrial life, and to do it thoroughly, and with a system that has commanded the attention of all men. To-day her trade has grown by leaps and bounds, and she properly commands universal attention, and she is making herself felt throughout the whole civilized world, because she appreciates the finished product of humankind.

I believe that all life is but a bundle of experiences, and, when we get together, if we will follow the old Methodist love-feast plan of telling our personal experiences it will be helpful to us. Besides it flatters one's vanity to relate his experience occasionally, if that experience is pleasant, and I am going to impose upon you long enough to say that Columbus, Georgia, occupies the unique position of being the only city in the United States that has a secondary industrial school, supported by the municipality, and which is the consummation and finality of a system that begins with a free kindergarten in a free public school building, evolving from that into a primary industrial school, taking up the simpler forms of industrial education, and from that passing into this secondary industrial school building, where they do practical bread-winning. Not only is it a trade school, but it is an academic school, so that tney can know and understand, so that they can do and accomplish, so that, when they come out, they are a finished product of the humankind industrially.

A principle of this industrial school that we have in Columbus and what I believe is one of the best things in it, is this, that, when a scholar is ready to graduate that student must work six weeks practically in some institution, where he or she (for it is co-educational) can get practical education in whatever line of work the student is going to take up. There they are taught practically what they have been studying theoretically for three years. If a girl expects to be a milliner, she must work in a millinery establishment six weeks before graduation, and each week the proprietor of that millinery establishment must send a card, showing how that girl stands, not only as to how she does the work (efficiency), but whether she gets there early in the morning (punctuality), and whether or not she does her work with intelligence and whether she can design and create (mentality), and whether or not she deports herself in a proper manner, and understands what it is to work elbow to elbow with people who make their living by their daily toil. When these are all reported

favorably upon for six weeks, then, and not until then, are they eligible for a certificate of graduation.

In this school in Columbus we teach the girls how to be stenographers, typewriters, bookkeepers, milliners, etc. Cooking and domestic science in all their forms are taught, and, if pupils wish to go into the other departments, we have academic courses in laboratory work, chemical laboratory and biological laboratory. The best feature of all, perhaps, is that we have a practical, up-to-date cotton mill and hosiery mill. For the boys we have a foundry, machine shop and planing mill machinery; and bookkeeping, stenography and business education is open to both sexes.

Now in that establishment, which is operated by electricity—the power furnished from the Columbus Power Company's plant—every one of the machines are the very best of their respective classes. There is not a second-class machine in the whole establishment, not a lathe, or a planer, or a loom, or anything else, that is in any way a back number. It's all up-to-date. The pupils have to pass through a part of the public school system before they enter there, and, when they pass through the final six weeks of practical training, they know what it is to rise at 5 o'clock in the morning and work; work like they have to when earning their daily bread, and they have consideration for the people with whom they have to work.

We believe that's practical education. We believe that's not only knowing how to live, but actually living, and we believe that eventually Columbus manufactories will stand a great deal higher than they do to-day, because I hope to live to see that city say to the world, "If you will locate here, we will give you cheap power, and we will give you a high class of labor."

G. GUNBY JORDAN.

G. Gunby Jordan, of Columbus, Ga., was born in Hancock County, this State, and received his education at the high school in his native town.

At the age of seventeen he volunteered in the Confederate army and served as a private to the close of hostilities, in the celebrated Nelson's Rangers, an independent cavalry company which was honored toward the close of the war by being made escort company to Lieut. Gen. S. D. Lee. On his return from the army in 1865 Mr. Jordan attended school to the close of that year.

In January, 1866, he was offered and accepted a position in charge of the office of a wholesale mercantile establishment in Columbus, and retained that position one year.

In January, 1867, he was elected treasurer of the Eagle & Phenix Manufacturing Company, and served as treasurer and credit man of that corporation for twenty years. He was chosen cashier of the Eagle & Phenix Savings Bank in 1873 and was successively re-elected to that position for the next thirteen years, declining re-election to these offices at the annual meeting of the stockholders in 1886 in order to organize the Georgia Midland and Gulf Railroad Company. He was made president of the Georgia Midland Construction Company, which company built the G. M. & G. R. R. Mr. Jordan was made general manager of the Georgia Midland and Gulf Railroad Company in 1889, and during his incumbency as general manager inaugurated the movement, organized and secured the charter for the Columbus Southern Railroad, which was speedily built, connecting the cities of Columbus and Brunswick via Albany, and affording an outlet to the sea for the numerous manufacturers of Columbus.

In 1888 Mr. Jordan organized the Third National Bank of Columbus, and in 1889 he organized the Columbus Savings Bank; was elected president of both institutions, and sustains this relation at the present time.

During the month of July, 1894, Mr. Jordan resigned his position as general manager of the Georgia Midland and Gulf Railroad and severed his connection with railroad matters entirely in order to accept the appointment of railroad commissioner of the State of Georgia, which high trust was tendered him, unsolicited, by the then governor, William J. Northen. In 1901, though not an applicant, he was again appointed railroad commissioner for the full term of six years by Governor Candler.

Mr. Jordan is a director in several important New York corporations. He was a member of the special commission created by act of the Georgia legislature for the purpose of settling the celebrated Western and Atlantic Railroad betterments case, which commission unanimously and finally settled a case involving several hundred thousand dollars satisfactorily to every citizen of the State.

In 1895 he was unanimously elected president of the Georgia Bankers' Association.

It may be truthfully stated that Mr. Jordan has been connected with every movement that tended to the advancement of the interest of Columbus during the past quarter of a century, and as he has held in the past, so he now holds, responsible positions affecting the municipality, in all of which positions he has given, and is giving, valuable services to the city without compensation.

He, in connection with John Hill, inaugurated the movement for developing electrically the immense falls of the Chattahoochee River, which resulted in the organization of the Columbus Power Company, of which company he was president for a long period.

As a manufacturer, Mr. Jordan is director in several large corporations and president of the Eagle & Phenix Mills which employs 8,000 operatives.

It is perhaps the organization and creation of the Eagle & Phenix Club for the benefit, education, amusement and instruction of the operatives of the Eagle & Phenix Mills that he has shown the greatest practical opportunity for the uplifting of man that the South has ever enjoyed.

He was a charter member of and a leading spirit in the organization of the Columbus Public Library, serving the public for many years as a director in that institution.

Mr. Jordan was one of the organizers of, and is one of the largest stockholders in, the Perkins Hosiery Mills, one of the largest plants engaged in the manufacture of 84-needle hosiery in America. He is also president and principal stockholder in the Jordan Company, which owns large real estate interest in and near Columbus. It is a strong financial corporation, and is doing much for the development of the city.

Notwithstanding the multifarious duties which his various corporations and personal interests impose, Mr. Jordan finds time to give a great deal of attention to education and public matters in general. He is president of the Public School Board of Columbus, Ga., and as such was largely instrumental in the erection of the Columbus Industrial School as a part of the Free Public Schools. Mr. Jordan gave largely of time and money to the establishment of this school, and it may be justly regarded as one of his greatest achievements if measured by the good that it is certain to do to this city and State. He is also a trustee of the Fourth District Agricultural School, which is located at Carrollton, and makes frequent addresses in this and other States in the interest of education.

PROPER MEANS OF IDENTIFYING COTTON.

An Address Delivered Before the Eleventh Annual Convention of the American Cotton Manufacturers' Association, Philadelphia, May, 1907,

By R. G. Hitt.

During the years 1877-78, we began our experience as a warehouse salesman in the city of Augusta, Ga., following this with four years' experience as a public weigher, doing at the time, almost all of the business of the city.

Our duties required the re-weighing of large quantities of cotton for foreign and domestic use and the fact that fictitious gains were common and impossible of detection, were so evident that we were once seriously inclined to address the local mills at that time, upon identically the same subject.

One strong case in point, in this, our first experience—we were to receive and re-weigh one thousand bales for an exporter, from one of the larger warehouses. The cotton had been tiered for some time—perhaps six months—it was then July or August. This cotton gained in weight, over and above the figures marked on the bales, and on the bills, from ten to twenty pounds a bale. The cotton was superficially as dry as dust, and bore no evidence that it had ever been wet. We protested against marking up the weights, but were told that we had no right to decline to do this, as the cotton was dry and the re-weights must be right. The warehouse firm was perhaps the most careful in the city in regard to weights, and were never known to mark a bale above its real weight, and did not do so here—the facts were that the cotton was tiered wet, *the moisture being driven into the center,* the surface becoming absolutely dry, there to remain until opened at the mills.

During our experience and observation we have noticed that shipments across the water are often marked up, in anticipation of the gain in weight coming through the storage in the hold of the vessel—and again, it is an occurrence of the most common happening for cotton to be stored in damp situations, for this purpose, and again, the custom of placing cotton at the gin house flat on the ground, without protection, is another source of an artificial gain in weight.

It may be asked, if much of these gains are not lost before the cotton reaches the mills. This depends on conditions. It may be partly lost, it may be all lost, and an actual loss sustained, which is, of course, very common, especially where cotton is held in dry localities through the summer months. If bought by the mills, at the psychological moment, the mills will get all cotton to spin, but this is a chance which must be taken, and with the selling interests, as a rule, struggling to avoid a loss in weight, and with many determined to increase it, this chance becomes a chance indeed and one which should be avoided if it is possible to do so.

Through thirty years of the most active experience in handling cotton damaged by fire and water (for we have handled the great majority of all cotton losses of this character in the South during this period of time), we have had the most unusual opportunity to study the effect of outward applications of water on the interior condition of the bales.

Our opportunity to learn these conditions was afforded from the fact that large quantities of this cotton had to re-conditioned; that is, to be picked and re-baled and we were personally responsible for the condition, as we were handling a commodity against which there was much prejudice. The re-baled cotton most invariably showed a certain percentage of invisible moisture, from ten to twenty pounds a bale, varying with conditions. This cotton was re-baled without drying, as the moisture was rarely great enough to effect the spinning properties of the cotton, nor to attract attention except from a keen observer, or from one whose attention had been called to the fact.

It is fair to say that in cases of this kind that every bale is not affected. Those protected from the streams, of course, do not show the effect as those coming in contact with larger volumes of water.

Now to the point of protection, a law should be passed, either State or Federal, requiring the ginner to be a sworn weigher, to have his books open for inspection and to have his scales regularly attested, to be made to weigh every bale of cotton as it comes from the press, and before being exposed to the weather, and to have a fixed, indestructible, consecutively numbered metallic tag attached to each bale of cotton, conforming to the receipt, by which its identity could be preserved until it reaches its final destination.

A bill could be prepared to cover these points, and added to it, the requirement that the ginner's tag, when removed at the compress, should be re-attached, so that the bales identity should be preserved. If this law required the gin receipt to go with the bale, and this receipt to conform with the tag, it is evident that no fictitious gains in weight would be added to the bale, for the purchaser would become the custodian of the original weight at the gin.

It might be contended that if no gains are to be allowed, no losses should be allowed. A loss would show for itself, there is nothing to defend a loss, as there is nothing to justify a gain.

There would probably be some opposition to such a movement of reform. Those benefiting by artificial gains in weight, would oppose it, but the great power of right is with the movement, and, if properly sustained, must triumph.

The legislature of Texas passed such a law three years ago, but the bill was vetoed by the governor on account of some defect, and there was not interest enough to press it any further.

The adoption of such a measure has been agitated in congress, but there was no force behind it to make it effective.

While we might be the beneficiary to some extent of the passage of such a law, it would be on account of our good fortune, if such exists, of having made a study of these conditions and an effort to provide a means to improve them, but our interest, if all we could hope for, would be put as a grain of sand to the seashore, as compared with the interests of the cotton mills of the world.

[Mr. Hitt is the inventor of a metallic tag for the purpose referred to in his address, which we have no hesitation in saying is the best thing we have yet seen.—Editor.]

Concrete has been employed in building construction from time immemorial, and the Romans were particularly adept in its use, and the fact that so many of their engineering works have survived is due to the good quality of their concrete.

PRESENT STATUS OF THE COTTON BOLL WEEVIL.

Following the plan that has been pursued for several years, the U. S. Department of Agriculture has recently made a careful examination to determine the present status (June 1) of the boll weevil.

The results of the examination on the whole are very encouraging. The number of weevils per acre present at this time seems to be much smaller throughout the infested area than at this time last year. This must be due primarily to the unfavorable weather last fall, especially the very early first killing frost.

In northern Texas eighteen fields were examined and an average of three weevils per acre was found. In this area in 1907 no weevils were found on the first examination. This constitutes the only considerable exception to the generally more encouraging report of this year. In eastern Texas the examination revealed no weevils in 23 fields in six localities visited. An examination last season showed 226 weevils per acre at this time. In southern Texas the examination included seventeen fields in six localities. An average of 256 weevils was found as against an average of 308 in the same localities last season. In western Texas five fields were examined, showing an average of eleven weevils per acre as against 101 in this locality in 1907. In central Texas the conditions seemed to be almost exactly like those found in 1907. Thirty fields were visited in central Texas at Austin, Brenham, Corsicana, Giddings, Mexia, Navasota, and Waco. At these places an average of 176 weevils was found as against 174 for 1907.

In Louisiana fifteen fields in five localities were visited. The localities are as follows: Alexandria, Evergreen, Mansfield, Marksville, and Shreveport. Here an average of 174 weevils per acre was found as against 485 for 1907. The general condition in Louisiana seems to be much more favorable than last season. Nevertheless localities have been found in that State where the number of weevils present per acre is very high. In a portion of Avoyelles Parish as many as 6,000 weevils per acre have been found.

In Arkansas four fields were examined in two localities with a showing of 24 weevils per acre in comparison with about the same number in 1907.

In Oklahoma, as in Louisiana, the conditions are evidently much more favorable than last year. In the State of Oklahoma five localities were visited and no weevils were found. Of course this does not mean that weevils will not occur later, since the insects have not emerged from hibernation or at least have not emerged in such numbers as to result in their being found under the conditions of the rather careful examinations that were made.

COTTON BAGGING.

Below is a copy of a letter received by us in answer to a query regarding the consumption of jute bagging for the cotton crop. We give space to it as coming from one that should be in a position to give an approximately correct idea of the amount of bagging that is consumed for covering the cotton crop. We are desirous, however, of getting more information on the subject, and publish the letter in hope that we may hear from others, especially in regard to the consumption of second-hand bagging. The only comment we have to make on the communication below is that the author is probably in error in stating that seven yards instead of six are generally used for covering a bale, and we think he has overestimated the amount of second-hand bagging consumed. We also think that he is in error when he states that importations of cotton bagging are made at the ports on the Pacific Coast as there are no custom house statistics showing this to be a fact. There are some jute bags imported at the Pacific ports but no bagging suitable for covering cotton or so denominated. The letter reads as follows:

"One year with another we figure the entire amount of consumption of bagging at seven yards to the bale and do not find that this varies very much. With the price of bagging at or below seven cents we figure the consumption of second-hand materials of all kinds at one yard per bale on the whole crop. As the price rises, the quantity of second-hand material consumed increases, until, in the past crop we figure a total consumption of about 20,000,000 yards on 11,500,000 bales. This year we believe that second-hand materials of all kinds will not exceed 12,000,000 yards, owing to the lower price of new bagging. There are some twenty bagging manufacturers, large and small, in this country. It is very difficult to form any idea from the custom house returns, of the amount of cotton bagging really imported. Importations are constantly arriving on the Pacific Coast, manifestly for the purpose of covering hops, being entered as cotton bagging on account of the low duty."

BUYING COTTON ON NET-WEIGHT BASIS.

The following letter is from one of the largest cotton spinners in England, and who was one of the most active and most respected delegates at the Atlanta conference of spinners and growers held in Atlanta in October of last year.

Editor Cotton: The resolution passed at Atlanta that cotton should be bought on net weight terms only, was confirmed at the late Paris congress. A draft of a contract form, framed with the above object, was placed before the congress, and accepted as a basis to place before our European exchanges, upon which to build up the new method advocated. It will be a stout fight, and will take some time to beat down the old-fashioned opposition to improved methods, but it is bound to come. Your people can help greatly in the fight and it is to their interest to do so, but you are just about as conservative in the South as our folks in England, and it is difficult to get them to make the first essay, and particularly so when the buyers of cotton do their utmost to oppose any change, fearing an interference with their special interests.

Buyers are very much afraid that spinners and growers may get too close together and become friendly, and that the grower may discover other channels for the sale of his cotton than his old-fashioned country market. But it is coming, and quicker than I ever dreamed of. The Atlanta congress has done more to spread knowledge on the subject than anything else—it was the grain of mustard seed which will one day be a great tree.

Yours truly,

H. W. MACALISTER.

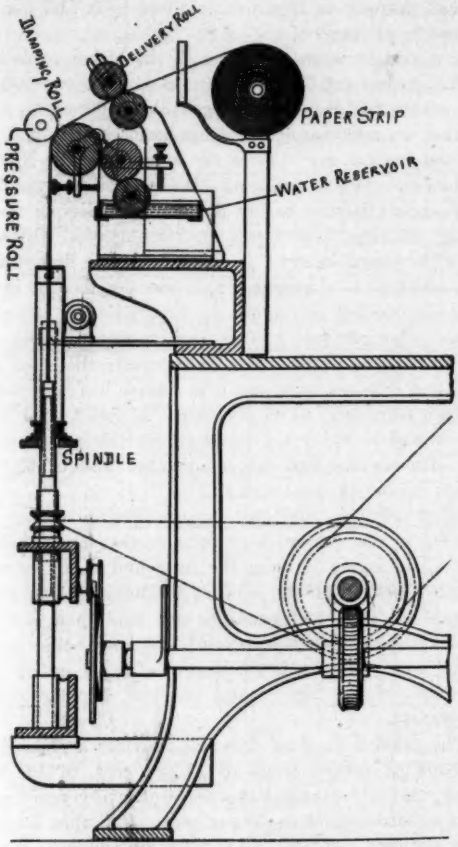
Manchester, England.

The Louisiana legislature has appointed a committee to consider and report two years hence on the advisability of establishing a textile school at Jackson, La.

Concrete was in bad repute twenty or thirty years ago, owing to the ignorance of the builders, who used it in a haphazard manner.

SPINNING PAPER YARN.

We have had, of late, a number of inquiries concerning the spinning of paper yarn as seems to be pursued to some extent in Europe. There is, apparently, a lucrative industry in the production of this kind of yarn for various textile purposes, among which may be enumerated druggets or floor coverings.



The method which we illustrate herewith is something new, and will, at least, give an idea of how paper strips can be converted or twisted into yarn. Prior to the method here shown the paper strips, dried in the usual manner and wound on rollers, were steeped in water before the commencement of the spinning operation. They were then taken out of the water and the moist strips from these rolls were rounded by friction, or the strips were drawn, by means of delivery rollers, through a bath and carried, by the guide rollers, to the spindle. By this method the strips become too moist and the point at which the moistening takes place is at too great a distance from the spindle, which has the disadvantage that the paper strips are apt to adhere to parts of the machine and, in consequence of their loose nature, they are easily stretched to excess and break. It is, therefore, impossible by this method to spin very thin, narrow strips of paper, so that sufficiently fine threads can not be made.

It is intended, by the contrivance shown in the accompanying drawing, to render this possible, and it is not only possible, to spin threads so fine that, for example, comparatively fine fabrics can be made, but the paper threads, by the paper being allowed to remain in better cohesion before spinning, are rendered stronger than by the old method. The new spinning machine is thereby characterized, that the paper strips, after leaving the delivery rollers and just before being run on the spindle, run over a damping roller, to which moisture is communicated by other rollers which are adjustable with relation to one another, so that the measure of moisture can be regulated to a fine degree.

The accompanying drawing is a vertical section of the spinning machine. The machine is furnished in the usual manner, with a peg for the reception of the paper-strip wound into a roll. Beyond this peg are the delivery rollers, and beyond these is the damping roller, above or besides which a pressure roller may be employed. The liquid for moistening is contained in a reservoir, in which a take-up roller runs. A transmission roller runs against the latter and communicates the moisture to the damping roller. This adjustment is made according to the kind of paper used and the yarn to be spun. The spinning of the paper is performed in the usual manner by the spindle, which is placed vertically below the damping roller in such a manner that its axis extends substantially tangential to the roller. In this way no additional means are necessary for properly guiding the moistened paper strips from the damping roller towards the spindle, so that any tearing of the strips is prevented.

COTTON MILLS IN GERMANY.

GERMANS SLOW TO AVAIL THEMSELVES OF MODERN MACHINERY. LEADING MILL TOWNS. STATISTICS OF SPINDLES AND LOOMS. THE AMERICAN WEAVER IS SUPERIOR TO THE GERMAN. A PENSION SYSTEM.

Abstract from report of Special Agent W. A. Graham Clark to the Bureau of Manufactures, Washington, D. C.

In the manufacture of cotton goods Germany holds third place, being only exceeded by the United Kingdom and the United States. In the exports of cotton goods Germany is only exceeded by the United Kingdom. Raw cotton is the largest single import of Germany, and manufactured cotton the largest export. In 1907, the average value of the cotton imported was 12.14 cents per pound, and the average value of the manufactured product was 63.84 cents per pound.

Cotton manufacturing is an old industry in Germany, and before the introduction of machinery there were well-known centers of weaving, knitting, braiding, lace making, etc., in Saxony and on the Rhine. The German people were slow to avail themselves of the introduction of modern machinery, so that many local hand industries were stifled by the flood of machine-made goods from other countries, and for a long time Germany obtained the bulk of its cotton goods abroad, mainly from England. The unification of the German Empire in 1870 awakened the national spirit, and, encouraged by a firm central Government, there began an agitation for the manufacture of cotton goods at home. The 1,500,000 spindles taken over with Alsace-Lorraine put the German industry ahead of the French, and this lead was further widened by the increased momentum in the cotton-manufacturing industry about 1879. Since then there have been no very remarkable spurts, but a gradual and steady growth.

Saxony is the leading German State in cotton manufacturing, and has nearly trebled its spindles in the last

twenty years, but its increase has been even greater in special lines like those of knitting and embroidering.

Mulhausen in Alsace is the most important town in Germany as regards spindles and looms. Nowhere in Germany is the cotton industry better organized than at Mulhausen, and this place has become noted for its fine muslins and print goods. One of the main products of this place is a fine cotton print known locally as a 75/26 print, but which would be called in the United States a 24/26 print—that is, with 24 warp and 26 filling ends per ¼ inch. These are made 31 to 32 inches wide, and some of them are exported to the United States.

Chemnitz stands twelfth in number of spindles, but is one of the most important cotton manufacturing towns in Germany. Its importance is due to the fact that it is the center of the German knit goods manufacture. Plauen is a town with no spinning and few looms, but is also an important cotton-manufacturing center, owing to its etched lace and embroidery work. Very little machine-made lace is made in Germany, but the largest factory of this kind is at Dresden. Barmen in the Rhine Province, is noted for its braided work and for its manufactures on the ribbon loom. Crefeld is noted for its velvet manufacture and velvet dyeing; Elberfeld for its dyeing; Munchen-Gladbach for its colored goods, etc.

Comparatively few of the German mills have both spindles and looms, and in the big centers the mills specialize on either spinning or weaving, as is the custom in England. The more remote mills in the country sections of Alsace and the Rhine usually weave their own yarns.

The following table shows the status of the German cotton manufacturing industry at the end of 1905, giving the details of the industry in each State:

States.	Spinning mills.	Spinning and weaving mills.	Weaving mills.	Spindles.	Looms.	Bales of cotton consumed.
Saxony	98	7	84	1,908,580	39,230	358,065
Bavaria	18	13	53	1,877,632	31,092	300,000
Alsace	16	32	43	1,536,562	30,919	240,000
Westphalia	17	19	36	1,456,636	25,729	255,300
Rhine Province	42	24	21	1,275,355	24,408	287,000
Wurtemberg	11	17	148	761,440	19,352	115,000
Baden	10	13	28	526,804	16,744	80,134
Hanover	1	7	18	225,000	5,024	48425
Silesia	9	5	45	133,930	16,540	28,315
All others	7	6	47	268,270	13,155	19,020
Total	225	142	493	9,730,200	231-199	1,761,369

There has not been a table made up by anyone since 1905, though the president of the German section of the International Federation of Master Cotton Spinners' and Manufacturers' Association estimates that on March 1, 1908, there were in Germany 9,592,855 spindles in operation, and 455,946 being installed, or a total of 10,048,801.

The most important cotton mill, though not with the largest number of spindles, in Germany, also the best paying, as shown by its published dividends, is the Augsburg Mechanische Baumwoll Spinnerei und Weberei at Augsburg, in Bavaria. This mill has 126,940 spindles running on average No. 17s English, and 2,920 looms, of which 520 are on bleached goods, especially printers, and 2,400 on heavy gray goods. It employs 3,000 operatives. The mill was founded in 1837. The dividends distributed by this mill to its stockholders for the seven years ended with 1906 were, in consecutive order, 20.4, 14.6, 16, 23.5, 17.5, 23.5, and 28 per cent., or 143.5 per cent. in the seven years.

Heating and ventilation in this mill is carried on by means of flues built in the wall, the air going up the flues on one side and being drawn down to the basement again through the flues on the other side. Separate dressing rooms with clothes lockers are provided for the men and women on each floor. There is also provided a large hall with tables and chairs where the operatives can eat their lunches. Coffee and milk is sold in the morning, hot soup at noon, and beer at 4 o'clock. Until 1906 this mill ran an 11-hour day, but it then changed to 10 hours. This 9.1 per cent. decrease in time was followed by a 7.85 per cent. decrease in production.

In regard to wages at this mill, the picker room hands and the carders get 50 to 70 cents a day; on two 900 self-actor mules the spinner averages about 90 cents a day. Weavers, on an average, run three looms apiece, and make about 80 cents a day; 170 of the looms have the Northrop attachment. At this mill a man is supposed to serve a two-years' apprenticeship before he can do as simple work as that of running three looms on plain goods. He has to sign a two-years' contract to this effect. He first works as extra assistant to a weaver for six months, then he is given one loom, which is run under the supervision of the regular weaver, who receives a certain percentage on the wages made. Then he is given two looms under the same conditions, and it is not until the new weaver has been working for two years that he is considered a full-fledged weaver and allowed to enjoy the fruits of his labor without division. During the first six months the mill usually pays the apprentice 24 cents a day.

After all this elaborate apprenticeship system it is doubtful if the weaver is as good as the young American weaver who comes in from the farm and in a few months at most is getting off the required production along with the others. All fines and penalties are paid to a sick fund. Besides the regular Government insurance, this mill has special insurance funds of its own for the relief of the sick, for old age and invalid pensions, for the relief of widows, etc.

The pension fund of this mill provides a pension after 20 years of service equal to 30 per. cent. of the annual wages; this is augmented two per cent. every year up to 40 years service when it is 70 per cent. It is then augmented three per cent. per year up to 50 years when the worker is entitled to a pension equal to his regular wages. Except in special cases a worker is not accorded a pension until he has reached the age of 50 years.

COTTON CLOTH WANTED FOR CLOTHING.

An American consular officer in a European country reports that the local government wants a large quantity of cotton cloth, shirtings, and other textiles suitable for clothing to be used in many of its institutions. He encloses samples of the material used, with prices of the same. American firms who can not correspond in German with the official named in the report may send their prices and catalogues to the consulate, and the consular officer states he will be glad to translate them directly into the language desired. The particulars can be obtained by writing to the Bureau of Manufactures (No. 2417), Washington, D. C.

There is no material more suitable for fire-resisting work, and, indeed, for constructional work in general, than concrete, and its value is becoming more widely recognized day by day.

Inquiries about anything pertaining to the textile business will be cheerfully answered by COTTON.

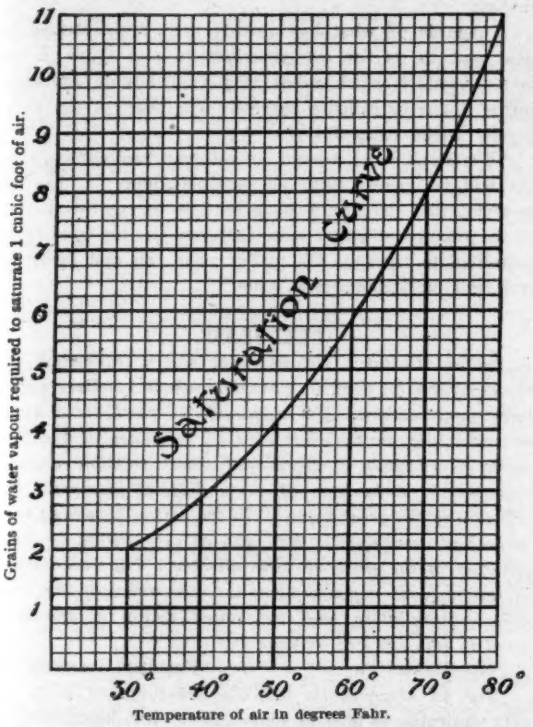
HUMIDITY IN COTTON MILLS.

The air may be saturated with water vapor; that is, a point may be reached when no more water vapor will be held in solution by the other gases of the atmosphere.

The amount of water vapor required to saturate the air depends on the temperature of the air.

The presence of moisture in the air is absolutely essential to every form of life with which we are familiar.

The term "humidity" is used to indicate the state of the air with regard to water vapor, and it is expressed in percentages of the amount of vapor which is required to saturate it. When the air is saturated with water vapor, it is said to contain 100 per cent. of humidity.



If the curve be read from right to left it will be evident that when air saturated with water vapor is raised in temperature without addition of moisture the percentage of humidity falls rapidly.

It is plain, then, that before a correct idea of the dampness or dryness of the atmosphere can be got, it will be necessary to consider the two factors.

1. Amount of vapor in the air.
2. Temperature of the air.

If the air at 80 degrees were cooled to 70 degrees, 3 grains of water would be deposited as dew; if cooled from 80 degrees to 40 degrees, 8.1 grains of dew would be deposited.

The deposition of dew will occur in any case where saturated air is cooled.

Air containing 90% to 100% humidity is very damp.
Air containing 80% to 90% humidity is damp.
Air containing 70% to 80% humidity is neither damp nor dry.
Air containing 60% to 70% humidity is dry.
Air containing 50% to 60% humidity is very dry.
Air containing less than 50% humidity is uncomfortably dry.

If very damp air at 50 degrees be raised in temperature to 80 degrees it will become uncomfortably dry, although it loses none of its moisture, and being uncomfortably dry.

Humidity of Air Saturated at	Humidity of the Air raised in Temperature to			
30°=100%	40°=69%	50°=48.8%	60°=34.5%	70°=25 %	80°=18.2%
40°=100%		50°=70.7%	60°=50 %	70°=36.8%	80°=26.4%
50°=100%			60°=70.7%	70°=51.8%	80°=37.3%
60°=100%				70°=72.5%	80°=52.7%
70°=100%					80°=72.7%

We say the air is "dry" when water evaporates rapidly, and the air is "damp" when the process is slow. Our judgment is, in this respect, independent of the absolute quantity of moisture in the air.

Air is capable of absorbing an increasing amount of aqueous vapor with every increase of temperature, e. g.: at 32 degrees Fahr. a cubic foot of dry air can take up 2.13 grains of water; at 80 degrees Fahr. it can take up 10.98 grains. The amount of moisture necessary to saturate the air, therefore, varies greatly at different temperatures.

As a rule the air contains less moisture than is required to saturate it, but it is never free from moisture. To enable us to form a correct judgment as to what is generally termed the "dryness" or "dampness" of the air, we must have some method of ascertaining the amount of moisture at a given temperature. For this purpose the hygrometer is used.—*F. Scarisbrick.*

COTTON MILLS IN CHINA.

TWENTY-EIGHT MILLS IN THE EMPIRE WITH 750,000 SPINDLES. TWELVE ARE IN SHANGHAI. PRODUCTION PER SPINDLE FIVE OUNCES IN TEN HOURS.

There are now 27 cotton-spinning power mills in China, according to the U. S. Consul at Tsing-tau, to which may be added the mill in Hongkong, also engaged in turning out yarn for the China market. The mills originally started in Shanghai, which at present boasts of 12, had many obstacles to contend with at the start and for several years after, such as labor difficulties, cotton cornering and cotton watering; losses were sustained, and in several cases capital had to be written down.

The years 1903 and 1904 were the worst since 1900, but 1905 and 1906 were good average years. Cotton was cheaper, and the mills were kept running night and day.

Chinese cotton is whiter than Indian, and the product of the Shanghai mill is superior in color and cleanness to either Japanese or Indian yarn, but being shorter in staple it is not so strong, nor is it so well reeled, owing to the low class of labor employed in this department, and no amount of supervision can obtain what may be considered high-class work. Taking Chinese labor as a whole, it may be considered as good as either Japanese or Indian, and when the difference in the quality of the cotton is considered it is relatively as cheap.

The number of spindles in these 28 mills is approximately 750,000, and the production per spindle, working day and night, is from 11 to 13 ounces, according to counts, which are 10's, 12's, 14's and 16's. With 12 ounces as the average, these 750,000 spindles are capable of a daily output of 562,500 pounds, and on the assumption that work is carried on 320 days of the year, the annual output would be 180,000,000 pounds of yarn, a quantity equal to more than half the foreign import.

What becomes of this yarn? The great bulk of it finds

its way into the country round Shanghai, and becomes the warp of Chinese cloth woven on hand looms, which is exported in enormous quantities under the name of nankeens to northern China, but especially Manchuria, principally by junk.

MANUFACTURE OF COTTON WASTE IN GERMANY.

LARGE QUANTITIES OF WASTE IMPORTED FROM THE UNITED STATES.

Special Agent W. A. G. Clark writes to the Department of State, Washington, that in Germany the manufacture of cotton waste into a great variety of finished products is quite an industry. Not only do the mills manufacture the waste from German cotton mills, but they also import cotton waste from all sections of the globe and, in many cases, ship the manufactured article back to the country from which the waste was bought. The cotton waste imported is listed as cotton linters, or as waste from cotton mills. The following table shows the import of cotton linters into Germany for the year 1907:

	Pounds
United States	38,069,912
British India	14,450,306
China	2,680,284
Dutch India	888,653
Egypt	914,440
Great Britain	1,128,228
All other countries	2,249,402
Total	60,381,225

Of the linters re-exported, 6,158,417 pounds, the bulk goes to waste mills in northern Austria and the remainder to other neighboring countries.

The waste from cotton mills—sweeps, flyings, strips, etc.—imported into Germany for 1907, and the cotton-mill waste exported to other countries during the same period, is shown by the following table:

Country	Imported Pounds	Exported Pounds
United States	3,409,373	6,083,701
Austria	16,179,564	14,540,449
Belgium	4,063,294	4,843,510
British India	1,025,742	.....
France	13,530,136	5,132,014
Great Britain	13,906,358	912,456
Italy	1,551,836	279,026
Japan	721,590	.....
Netherlands	10,946,607	15,718,928
Switzerland	4,547,513	1,494,092
All other countries	2,497,347	3,989,922
Total	72,379,360	52,994,098

It will be noticed that several countries both ship waste to and import waste from Germany. France and Austria, for instance, ship waste to Germany from various places, while Bohemian waste mills import waste from the German mills near at hand, and Alsace-Lorraine ships some waste over the French border. Germany buys all kinds of cotton waste from the United States, but especially soft waste, such as sweepings, flyings, and strips. Some of this goes into the manufacture of coarse towels, scrubbing cloths, dish rags, blankets, etc., which is then exported back to the United States or to the Philippines.

PAPER MADE FROM COTTON STALK.

It has been stated that a good quality of cheap paper can be made from dried cotton plant stalks which heretofore have been regarded as a waste.

The Department of Agriculture, Washington, D. C., has been referred to as carrying on investigations along this line, and in order to ascertain the situation we addressed the department on the subject and have learned from the Forest Service that while the experiments made by the department on the cotton stalks have shown that a pulp can be manufactured which is suitable for many purposes, yet the investigations have not been carried to the extent of converting this pulp into paper of a merchantable quality.

A sample of what has already been accomplished has been sent to us for our examination, and shows a very coarse product which needs very considerable refinement before it can be called a success. The chief of the Forest Service writes us as follows:

"The work is, at present, in rather a preliminary stage, but will be pushed with all possible vigor. I may say, however, that the results have been so successful that one of the prominent paper manufacturers in this country has consented to take up the matter next fall and make several runs on a commercial scale."

CELLULOSE.

Editor "Cotton": Below please find a translation of a recent article by Carl G. Schwalbe which I believe will interest your readers. The investigations which Dr. Schwalbe is conducting on the chemistry of celluloses at the Technische Hochschule in Darmstadt, form valuable contributions to the technology of the industries involved. Oxycellulose is the great "spook" in the cotton bleaching trade, while hydro-cellulose is met with as octo-nitrate of hydrocellulose in the imitation-silk industry.. The carbonization of union goods depends upon the conversion of the cotton into hydrocellulose, and mercerised cotton is closely related to this class of substances.

Philadelphia, Pa. FREDERIC DANNERTH.

For an examination into the bleaching of pulp it is very desirable to possess some method for determining the extent to which the bleaching has progressed. If cellulose be "overbleached" a small amount of chlorine derivatives is produced, but the chief products of the reaction are substances related to oxycellulose. If the bleach has been carried out with the aid of mineral acids there is a further possibility of hydro-celluloses having been formed. I have endeavored to use the reducing power of these substances as a means of identifying them. It has been found that the difference in the reducing power of "normal bleached" and "overbleached" sulphite-cellulose is so great that from it the extent of the bleach may be ascertained. The values found for the reducing power of hydro-, oxy- and hydrate-cellulose may well be used for the chemical distinction of these little known varieties of cellulose. The values given in the table were determined as follows:

Water: A three gram sample of the cellulose was dried in a toluol oven. As cellulose undergoes a chemical change at 90° C. the "reducing power" should not be determined in this same sample.

Reducing Power: In a second weighed, air-dry sample a determination of the reducing power is made and calculated to 100 grams of absolutely dry cellulose. The details for the determination of this "copper number" are as fol-

lows: A sample of about three grams of air-dry finely divided cellulose is treated with 200 cc. water and 100 cc. of Fehling solution. Heat this mixture and maintain at the boil for fifteen minutes. The liquid must be stirred constantly in order to prevent bumping. The evaporated water should be replaced in order to keep the concentration constant. The most suitable apparatus was found to be that suggested by Gnehm,—a round-bottomed flask with centrifugal stirrer and reflux condenser. After the liquid has been properly boiled it is filtered by means of a suction flask, using a hardened filter. The residue is washed with boiling water until no copper can be detected in the filtrate. The residue on the filter will consist of a fibrous mass having a more or less intense red-brown color, depending on the reducing power of the cellulose used. The cuprous oxide is removed by treating it on the waterbath with dilute nitric acid (30 cc. of a 6.5 per cent. acid). The bluish solution is passed through a hardened filter, washed with boiling water and finally concentrated so that it may be subjected to electrolysis in a platinum dish. The simplicity of the electro-analysis makes it preferable to the volumetric method. With the aid of a rotary anode the electrolysis may be completed in from 30 to 60 minutes. If like conditions be maintained the results agree very well, so, for example, in the case of a sulphite cellulose.

REDUCING POWER OF VARIOUS CELLULOSES.

Experiment	Material	Cop. Nos.	
1	Absorbent cotton	1.64	1.8
2	Mercerized cotton, maco yarn bleached and beaten	1.9	1.6
3	Imitation silk "Glanzstoff"	1.1	--
4	Hydrocellulose (from absorb. cotton filter paper)	5.2	5.8
5	Parchment paper, ground	4.2	--
6	Sulphite cellulose, bleached pulp	3.9	3.9
7	Cellular mucilage "Pergamyn"	3.5	3.0
8	Sulphite cell-matter, overbleached pulp	19.3	--
9	Oxycellulose prepared from filter paper	7.9	7.6
10	Bleached cotton (pulp from rags)	6.5	5.6

Number one represents one of the purest forms of cellulose. The copper number shows that the bleaching process has wrought a chemical change, even though it be small, for pure cellulose is generally said to have no reducing power whatever.

Number two is a technical, mercerised cellulose made from bleached maco yarn. In order to dissolve the much twisted fibrils and so allow the Fehling solution to penetrate more thoroughly it was ground in the beater. The mercerising process has increased the reducing power only slightly.

The figures obtained give rise to a doubt as to the technical nature of the change which takes place on mercerising cotton. In the case of an imitation silk,—"Glanzstoff,"—the copper number is still smaller. The exact determination of the number could not be made at this time as the imitation silk seems to form a blue copper compound with Fehling's solution. The same thing was observed in the case of absorbent cotton mercerised without tension. The copper numbers of these two last named substances are apparently quite close to one another.

Hydro-cellulose proved to be quite different from either hydrated cellulose or mercerised cellulose so that Osts's surmise that hydro-celluloses and cellulose-hydrates are identical is probably not correct. Our work on the various hydrated-celluloses will soon determine whether there is a sharp difference between the cellulose hydrates obtained with the use of alkalies and the hydro-celluloses obtained from the action of acids. Parchment paper seems to be on the line between cellulose hydrates and hydro-cellulose.

A comparison of the values from a bleached sulphite cellulose and a sample of "Pergamyn" prepared in the beater shows that the difference in the reducing power is insignificant even though the physical state of the two products is not at all similar.

It was formerly supposed that the formation of "cellular mucilage" was accompanied by hydration, but Hoffmann has shown that sulphite pulp and the mucilage prepared from it give the same sugar values after being hydrolized. Hoffmann, therefore, concluded that sulphite pulp and "Pergamyn" must have the same chemical nature and that no hydration had taken place. The figures given in the table would at first sight seem to strengthen this point of view. If we, however, consider that there is but a slight difference between mercerised and unmercerised cotton (see the copper numbers), and that analysis has shown that hydration has taken place, we can see that the absence of chemical differences does not indicate anything concerning the state of hydration.

The copper number of the "overbleached" cellulose is rather striking when compared with that of pure oxy-cellulose. Nastukoff prepared this oxy-cellulose from filter paper and chloride of lime solution. It was purified by dissolving it in caustic soda and reprecipating it with acid. The purifying operations cause the copper number to decrease decidedly. It is probable, as Bumcke and Wolffenstein have emphasized, that certain oxy-celluloses such as Hydral-cellulose are split up by caustic soda into cellulose (an alcohol) and acid-cellulose (an acid). This reaction takes place very rapidly at the boil, but is incomplete at ordinary temperatures so that the solutions in caustic soda yield celluloses with reducing properties.

The 10th experiment shows that cellulose which has been used in the household and then made up into pulp has undergone a certain chemical change with the resultant formation of oxy-, and hydro-cellulose.

COST OF LABOR IN GERMANY.

The wages paid in cotton mills in different parts of Germany, vary, as also does the number of operatives required for a given number of machines or for a given production. For mills on similar goods and similarly located wages are lowest in Saxony and highest in Rhine. The mills around Augsburg seem to afford a fair average for the German industry as a whole. For a 30,000 spindle mill there is required under average conditions the following workers:

For general oversight: One superintendent; one foreman in the opening and mixing room; one boss carder and second hand in the card room; boss spinner for every 10,000 to 15,000 mule spindles; and one boss spinner for every 10,000 to 15,000 ring spindles.

Mixing room: One man for every six bales daily, and one girl for every twelve bales daily, to pick and bundle the bagging and do similar light work.

Picker room: One man to every two openers, one man to every two pickers or lappers, one man for the waste machine, and one lap carrier for every twelve bales daily.

Cards: One card grinder to every 24 cards, one operative to every eight cards, and one can girl to every 16 cards, the cards making 165 pounds in ten hours.

Draw frames: One girl to 16 deliveries for fine slivers, to make No. 30's and above, and one girl and an assistant for coarse numbers.

Fly frames: One operative to every 80 slubber spindles; one operative to 120 intermediate spindles on hank rove

under No. 1.4—above this number there is required one helper to every two frames; one operative to every 144 spindle fine frame under 3½ hank roving, with the addition of one helper for every two frames making over No. 4 hank roving.

Mule spinning: For every two mules containing 1,800 to 2,000 spindles one spinner, two piecers, and two creelers, if on numbers under 20's; for finer numbers for a similar number of spindles one spinner, one piecer, and one to two creelers.

Ring spinning: One girl spinner to every 300 to 400 spindle warp frame on No. 20's; one girl for every 380 spindle frame on filling, with one young assistant for every two frames; for every two spinning frames one girl doffer.

There is required one engineer and one assistant in the engine room, one dynamo tender and one transmission tender and machinist, one fireman and one coal passer for every 200 horsepower, one head machinist and two assistants, one wood turner and carpenter, one gate keeper, etc.

The operatives per 1,000 spindles average between six and eight.—*U. S. Consul W. A. G. Clark.*

DEPRECIATION OF MACHINERY.

DEPRECIATION DEPENDS ON AGE OF THE MACHINE AND CONTEMPORANEOUS PROGRESS. FIVE PER CENT. OF ORIGINAL VALUE SHOULD BE LAID ASIDE ANNUALLY.

BY CHARLES T. MAIN.

No hard and fast rule can be established for marking off the value of machinery. The percentage of depreciation depends only in part upon the age of the machine. To a far greater degree it is affected by contemporaneous progress in the line of manufacture which it was designed to promote.

The two most important things which determine the market value of machinery are:

First. Its comparative ability to turn out a product in quantity and quality equal to that of the most improved machines.

Second. Its actual condition with respect to wear and tear.

Although a machine may not be worn out, or even may have been run but very little, it may be unprofitable to run, because other machines have been introduced which do so much more or much better work. These machines may be used to advantage in some other concern, and may on this account have more value than scrap. Parts of machines have been improved so that these portions may be changed while leaving a portion of the machine as before; as, for example, cotton spinning spindles, so that depreciation might be applied to a portion of a machine instead of to a machine as a whole.

The depreciation for actual wear and tear will vary with the severity of the work done, speed of the moving parts, the care taken in the running, and the amount laid out in repairs.

It seems to me impossible to separate the depreciation from wear and tear altogether from that due to improvements, in arriving at its present value, and it is customary to treat them in a general way, allowing a definite depreciation to cover both.

Any concern which does not lay aside, at least, five per cent. of the total value of its plant if new, and apply the same at intervals towards the renewal and improvements, will find itself at the end of twenty years in a position not able to compete with success with modern equipped concerns, and it will be necessary to make radical changes at great expense calling for new capital.

It is often stated that there is no depreciation during the first year of running; that the machinery will do better work after it is limbered up and adjusted than when it is set to work. As a matter of fact, depreciation does begin immediately, although not perceptible. After the first year, depreciation is charged sometimes at a uniform rate of five per cent. over all the machinery, due allowance being made for any removal of parts outside of ordinary repairs. I have used in several cases a depreciation of five per cent. up to the dressing room, and four per cent. for the dressing room and beyond. This view has been presented to me by a member of the Society of Mechanical Engineers, that after the first year the depreciation should be marked off five per cent. to ten per cent. a year until the value is brought down to one-half the original cost; then to maintain its value about level for a while, until it becomes apparent that it would soon be profitable to replace the machinery, when the depreciation goes on at a more rapid rate. This method may be profitable for a mill to pursue in its own bookkeeping, but it is not quite definite enough in making up a valuation for purchase, etc. It is sometimes the case that some of the machinery is older than these rates would allow them to be in existence, but they may be still there, perhaps for the same reason that the bridge remained which the engineer had figured could not hold up its load. When asked how he explained the fact that it did stand up, he said that the only reason that he could give was that it stood from force of habit. Some machines remain and do work long after it would be profitable to replace them. The value of such machinery to a purchaser is practically nothing, except that it may complete the organization of the mill and allow it to run until it can be replaced by new machinery.

If a sinking fund is created for replacing the machinery, three per cent. of the cost would replace it in twenty-four years. There is usually more value to machinery in a mill, even if the property were to be dismantled; but old machinery has no value except for scrap, which is very small, as the cost of taking down is about as much as the value of the scrap.

CONCENTRATION OF INDUSTRIES IN GERMANY.

Cotton manufacturing, with its many ramifications and special branches, is probably the world's greatest industry. In Germany each special branch tends to concentrate in some particular section and around some particular town. Thus Chemnitz is known for hosiery, Plauen for embroidered laces, Gera for fine dress goods, Crimmitzchau for vigogne yarn, Augsburg for fine spinning, Mulhausen for fine weaving, Elberfeld for colored goods, Crefeld for velvets, etc. The specialty of Barmen, in western Germany, and one that has caused it to be a familiar household word around the world, is braided work, and particularly that branch of braided work known as "Barmen laces."

The New England mills classify sizing ingredients somewhat as follows: (1) Strengthening ingredients; (2) softening ingredients; (3) Weighting ingredients; (4) antiseptic ingredients.

COTTON MANUFACTURING

BEAM WARPING.

Long Chain Beaming. Making Colored Warps. Ball Warping. The Leese.

by Will Nelson.

(*Concluded from July.*)

Some warping machines are equipped with a cone drive, which reduces the speed as the yarn is drawn from the spools. All machines are equipped with fast and slow motion pulleys; these are necessary, as much of the yarn would be broken out if the machine was started at full speed.

Often the beam warper is used for transferring yarn from the spool to the loom beam. In many such cases the creel is not used in the form of a V; one leg or side only is used, and the tiers are fixed, with the spools in each tier facing to the side, and iron rods placed in front of each tier at about the center of the spool, and six to twelve inches from it. The creel is placed at an angle, with the end nearest the machine at the extreme left or right of the machine.

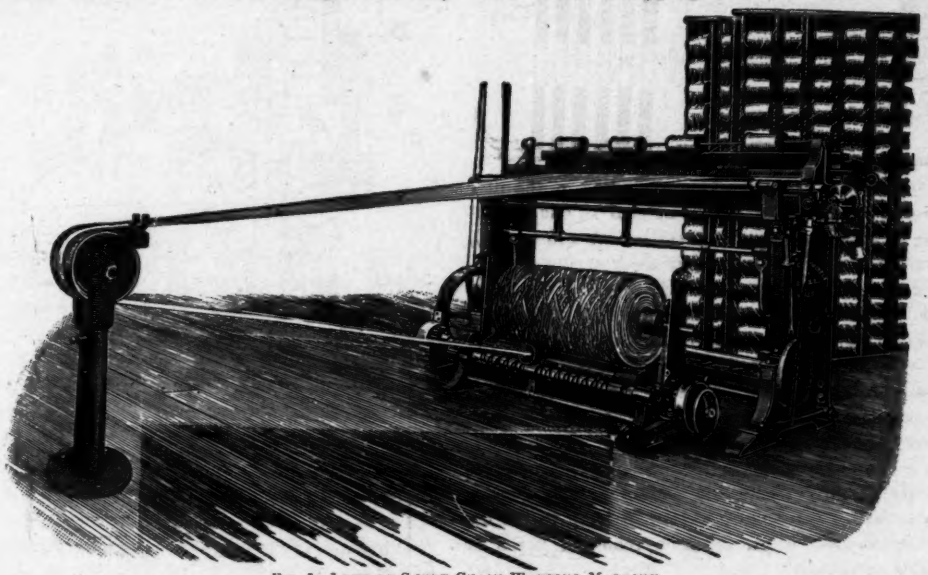


Fig. 5. Long or Short Chain Warping Machine.

Before passing on to the slasher, or sizing machine, for gray work, it will be best to consider long chain beaming, or the principle of making colored warps. There are practically two distinct methods used in the making of colored warps, namely: dyeing the raw cotton, and dyeing the warps in the chain. The former method is not used as often as the latter, because, as the dyed raw stock is passed through the picker and card, the machines have to be thoroughly cleansed after each color, which of course means more work, and a loss in production. But to offset this loss, the colors are faster both to light and wet, besides, the operation of long chain beaming is dispensed with. The colored yarns are run onto spools the same as gray yarn, and transferred to the back beam for the slasher.

When the raw stock is not dyed the yarn passes through the following processes: After it is spun, it is transferred in the regular manner on to the spooler. The spools are placed in the same form of creel in the warper as for straight gray warps, but the front portion of the warper is different in that the drum is taken out and a portion added which will make a ball warp, as shown in Fig. 5. The machine is then called a ball warper. In place of the usual expansion comb at the front of the machine, a leese comb or block reed (Fig. 6) is used. The threads pass through the reed alternately one end in the blocked portion, and the other end in the open dent. This allows a single thread leese to be picked, the leese being necessary because the yarn has afterwards to go through the dyeing process. Raising the threads cause those in the open dent to rise higher than those in the blocked dent. This gives one-half of the leese. Dropping the threads cause those in the open dent to go lower than those in the blocked dent. This gives the other half of the leese. The yarn passes through the leese comb, through the trumpet that is fixed to the stand, which supports the grooved pulley, around the pulley, then through a traverse trumpet, which guides the yarn, on to the roller that rests between the two friction drums.

Figure 7 shows a plan of the driving motion for the friction drums. The gears and driving pulley shown in the sketch will yield about 60 yards per minute. To find the speed of the driving pulley proceed as follows: 60 yards per minute required, the drum being 18 inches in circumference will require to revolve 120 times for 60 yards.

$$\frac{120\text{(rev. of friction drum)} \times 45\text{(gear on end of drum)}}{19\text{(the gear meshed into the 45 gear)}} = 284.2\ \text{(rev. of pulley on machine)}$$

The size of the driving pulley placed on the machine is according to demand, but usually it is 11 inches in diameter.

Suppose the machine is rigged with gears and driving pulley as described. What size of pulley or drum must be used on the main driving shaft, assuming the speed of the main shaft? Multiply the revolutions of the pulley by its

size, divide by the revolutions of the shaft, and result will be the size of the pulley required on the driving drum.

$$\frac{284\text{ (rev. of pulley)} \times 11\text{"(dia. of pulley)}}{280\text{ (rev. of driving shaft)}} = 12\text{"(drum)}$$

To find the revolutions of the main driving shaft, substitute size of drum for the revolution of the shaft, and the result will be the revolutions per minute of the shaft.

The reason why the other gears shown in the sketch are not taken into consideration is that they are merely carrier gears, and carrier gears simply transmit motion to others, or are used to reverse a motion.

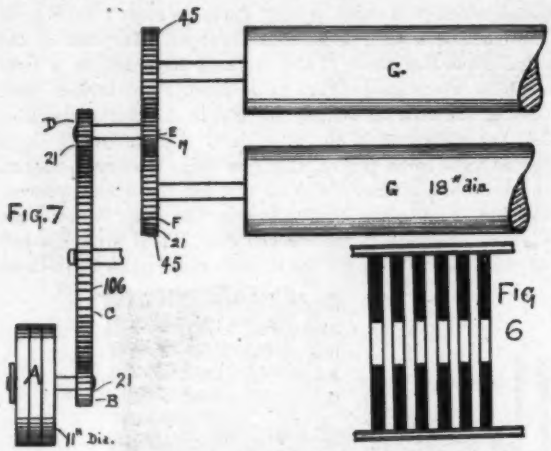


Fig. 7

Fig 6

To prove they are carriers: One revolution of the pulley A would be one revolution of the 21 gear B, one revolution of the 21 gear would be 21 teeth on the 106 gear C, 21 teeth on the 106 gear would be 21 teeth of the gear D, which has 21 teeth; one revolution of D would be one revolution of E (a 19 tooth gear), when the speed is changed, for the gear F would only go 19 teeth which would mean a part of a revolution of the friction drum G.

The stand or guide pulley is fixed 10 to 12 feet forward from the machine, to allow for the condensing of the width of the yarn to a small chain form.

Figure 8 shows the clock or measuring motion used to determine the length of cut and chain of yarn that is placed in the ball. The length varies according to the demand, the commonest length being a thousand yards or multiple of a thousand.

The simplest method of calculating a train of gears is to multiply the drivers together, and the driven together and divide the drivers by the driven. The results is the gear required.

The majority of trains of gears, can readily be figured by taking the alternate gears starting with the first, and multiply them together, then take the gears remaining, being careful to leave out carriers, and multiply them together, then divide the greater by the lesser, (which in most cases are the driven,) and the quotient will be the result required.

The above train of gears is as follows: Measuring roll A, 12 inches in circumference. On the end of this roll is a single worm B, driving a 48 gear C, attached to which is one D, with 16 teeth, that imparts motion to the carrier gear E. The carrier is meshed into the cut gear F, which is a change gear. It will be noticed that the gears have been increased three times the value of the first gear C, on the hub of which is a 16 gear—48÷16=3. One revolution of the worm is one revolution of the measuring roll (12 inches), so that one tooth of the 48 tooth gear equals 12 inches of yarn. One tooth of the 16 gear D, will be one tooth of the carrier, also one tooth of the cut gear F, and as the value of the latter gear is increased three times by the 16 gear, each tooth on the cut gear F, will be the value of one yard, as there are three 12 inches, or 36 inches, in one yard.

On the same stud as the cut gear F, is a second 16 tooth gear G, meshing into a 64 gear H, on the stud of which is a third 16 tooth gear K, which imparts motion to the leese gear L. On the same shaft as L is fixed the scroll or wrap measure M, being of the same construction and answering the same purpose as the scroll on the beam warper. On the gears below the cut gear F, the ratio is 4 to 1—64÷16 =4. The train of gears gives 1,000 yards to each wrap or leese, or turn of the scroll.

$$\frac{12\text{"(cir. of roller} \times 48 \times 80\text{ cut gear} \times 64 \times 80\text{(leese gear)}}{1 \times 16 \times 16 \times 16 \times 1} = \frac{36{,}000\text{ inches}}{36} = 1000\text{ yds.}$$

The cut and leese gears are often changed to give a different length of yards per cut and leese, and the following is the rule:

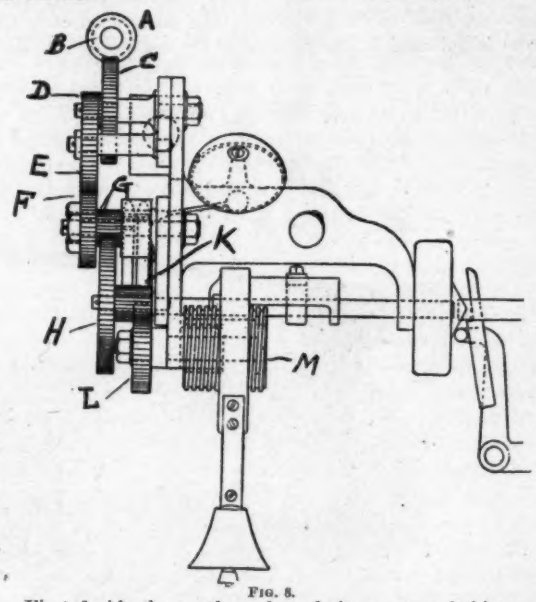


Fig. 8.

First decide the number of yards in a cut, and this must be between 20 and 80 as that is the limit of the cut gears. Then find the number of yards in one wrap or leese, one thousand yards is the limit of one warp, which must be a multiple of the number of yards in a cut; and it may be a fractional part so long as the number of cuts in the leese, when multiplied by four, will give a number not less than 20 or greater than 80.

The number of cuts in one leese multiplied by 4 (as the ratio is 4 to 1) will give the leese gear. Example: A warp of 3528 yards is required, cuts to be 48 yards in length, what is the leese gear required?

3528÷7 (warps)÷48 (yards in cut)=10.5 cuts in one warp.

10.5×4=42 leese gear.

The above number could be divided by 6 instead of 7, which would mean 6 wraps instead of 7.

A leese is always placed in the yarn when the machine stops at a wrap.

A warp of 3328 yards is required, 52 yards in a cut, what is the leese gear required?

3328÷4=832 yards in one leese.

832÷52 yards in a cut=16 cuts.

16 cuts ×4=64 leese gear.

COTTON CASSIMERE.

BY EMIL KAHN.

A cotton cassimere is a men's wear fabric composed of cotton, made in imitation of the higher priced woolen cloth from which it derives its name. While it differs considerably from the woolen goods in feel and wearing qualities, the general appearance, if properly constructed, is very close, and makes a very desirable fabric for the cheaper grades of suits and trouserings. These cotton fabrics are usually constructed on the double cloth system, two systems of warp and one filling or two systems of filling and one warp. The former method gives the best fabric, both in wearing qualities and general appearance.

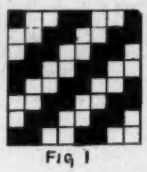


FIG 1

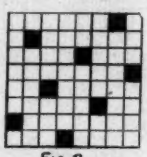


FIG 2

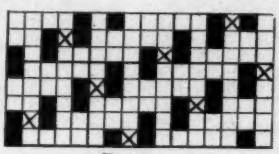


FIG 3

The coloring scheme should be of a subdued nature, and the texture quite firm, in order to withstand the rough usage the fabric is subjected to. The yarn should be made from a fair quality of American cotton of about 1⅛ inch staple.

Men's wear fabrics are confined principally to twill weaves for the face warp, $\frac{2}{2}$ twill, $\frac{2}{1}$ twill or a $\frac{3}{3}$ twill, while an eight-harness satin, or a $\frac{1}{3}$ broken twill, forms the back warp. The longer floats of the back warp tend to give the fabric a softer feel.

The face warp is usually drafted so as to form basket stripes, backward twills, or cord effects at regular intervals, thereby breaking the monotony of a plain twill face, and giving character to the coloring scheme. Spots or fancy figures do not enter into men's wear fabrics.

METHODS OF CONSTRUCTION.

A very satisfactory construction is an arrangement of one end face warp to alternate with one end back warp. The face warp weave is a $\frac{2}{2}$ twill and the back warp is operated by an eight harness satin weave $\frac{1}{7}$. This combination of weaves in connection with the proper counts of yarn produces a most satisfactory fabric.

Fig. 1 shows the face weave. Fig. 2 shows the back weave. Fig. 3 shows the face and back weaves combined, and illustrates how the back warp interlaces with the face warp, by rising between two risers of the face weave. This is termed perfect stitching, i. e., the back warp will not show on the face of the finished fabric.

PROPER TEXTURE.

To find the texture of the warp in this cotton fabric we must first know the counts of yarn used for the face structure, and secondly the weave. After ascertaining the texture, we must consider the back warp and weave. In dealing with a weave of long float for the back warp,—for example a $\frac{1}{7}$ satin,—we must allow a correspondingly small deduction from the ends found for the face cloth,—about 10 per cent. for a $\frac{1}{7}$ satin,—whereas, if dealing with a short floating weave, as a $\frac{1}{3}$ twill, we must make a greater deduction, about 20 per cent., from the previously ascertained texture of the face structure. Small floating back weaves are, however, very seldom used in an all-cotton fabric, principally because it tends to make the fabric too stiff, whereas the long floating weave imparts to the fabric a soft feel.

Formula for ascertaining face warp texture:

Face weave, Fig. 1. Back weave Fig. 2.

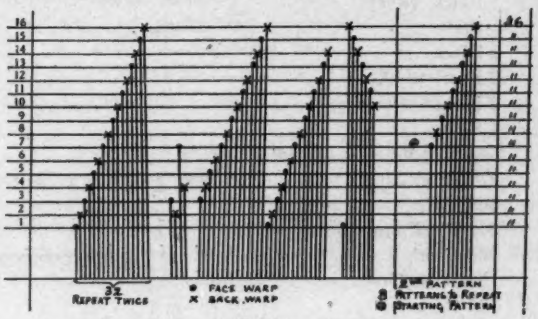


FIG. 4.

Face warp, 2/30's cotton. Back warp, 2/30's cotton. Filling, 2/30's cotton. 2/30's cotton equals 104 ends placed side by side, per inch.

Face weave, $\frac{2}{2}$ twill equals 4 ends and two points of intersection. $104 \times 4 = 416 \div 6 = 69.33$, proper warp texture for single cloth, less 6.93 (10 per cent. deduction for back warp), leaving 62.40.

The calculation shows 62.40 ends 2/30's for face warp, and 62.40 ends 2/30's for back warp.

Therefore, 124.80 ends should be used per inch for a perfect fabric.

Picks per inch should be 66—4 extra over the face warp texture.

The above calculation shows that a 565×8 reed, and 66 picks, are required for the unfinished texture.

While the foregoing calculation is accurate for producing a perfect fabric, most manufacturers under the stress of competition vary the structure to suit their convenience or to make it salable with a fair margin of profit; consequently very few fabrics of the above description are ever found to be perfect in texture. However, enough ends and picks per inch must be used to give the desired weight, as this class of fabrics is sold at a given number of ounces per yard—7¼ to 8 ounces for light weights for summer goods, and 8½ to 9½ ounces for heavy weight for winter wear. The finished width varies from 28 to 30 inches inside of selvage.

ANALYSIS OF A GOOD QUALITY OF CASSIMERE.

Light weight fabric. Width in reed 34 inches. Width of finished fabric, 31 inches outside of selvage. Reed 500×8. Ends per inch finished, 60. Ends in face warp 1848. 20 ends 2/30's, white selvage each side. Total ends in face warp 1888. Back warp same as face warp. Total ends in warp 3776. Take-up of face warp 12 per cent. Take-up of back warp, 8 per cent. Filling 2/26's cotton, 60 picks. Calculated weight per yard, 8.27 ounces. Finished weight, per yard, 8 ounces.

Face warp color arrangement for light weight fabric. See Fig. 4, drawing-in draft.

2-Black	1-Black
1-Dark Green X	1-Black and White (end)
1-Black and White	1-Black
1-Black	1-Slate
1-Slate	1-Black
1-Black	1-Black and White
1-Black and White	1-Black
1-Black	1-Slate
1-Slate	1-Black
1-Black	1-Black and White
1-Black and White	1-Black
1-Black (start)	1-Pearl 2/40's
1-Slate	1-Black
2-Black	1-Pearl 2/40's
2-Pearl 2/40's	
3-Black	36
1-Slate	

X—alternate with garnet

976-Black	38 2/30's
308-Slate	12 2/30's
307-Black and White	12 2/30's (1-20's and 1-60's)
206-Pearl	8 2/40's Mercerised Cotton
26-Dark Green	1 2/30's
25-Garnet	1 2/30's
1848	72
40 ends selvage	2/30's White

1888 total ends in face warp

Back Warp.

2-Back	
1-Dark Green X	
12-1-Slate (start nine)	
1-Black	
6-Black (end 3)	
12-Black	
1-Slate	
3-Black	
36	

X—alternative with garnet.

1181-Black	46 2/30's
616-Slate	24 2/30's
26-Dark Green	1 2/30's
25-Garnet	1 2/30's
1848	72
40 ends selvage	

1888 total ends in back warp

Full width, 51 patterns and 12 ends, or 25 patterns and 48 ends.

Thirty-six ends are really but one half of the pattern, but in order to save space writing the pattern out in full, only one-half is given with the exception of garnet for dark green, therefore we mark it X which indicates to the beamer to alternate the dark green with garnet.

Filling. 2/26's black cotton, 60 picks.

This color arrangement is particularly adapted for trouserings. In patterns intended for suitings the color arrangement is somewhat different, in so far that the dressing is such that the filling is practically the same as the warp. See warp and filling arrangement for heavy weight fabric which is a suiting pattern.

Fig. A is a sample of the fabric. B, C, and D are effective patterns for trouserings.

Face warp color arrangement for heavy weight fabrics. See Fig. 5, drawing-in draft.

Face.

Fig. 5.

8-Black and Drab	
8-Black	
8-Black and Drab	
8-Black	
8-Black and Drab (start 8)	
8-Black	
8-Black and Drab (end 8)	
8-Black	
8-Black and Drab	
8-Black	
8-Black and Drab	
2-Dark Green	
6-Black	
96	
882-Black	46 2/30's
928-Black and Drab	48 2/30's
38-Dark Green	2 2/30's
1848	96
40 ends selvage	2/30's white cotton

Back.

31-Black	Start 31, end 24.
1-Black and Drab	
32	
1791-Black	31 2/20's
57-Black and Drab	1 2/20's
1848	32
40 ends selvage	2/20's White

1888

Nineteen patterns and 24 ends in full width.

Total ends in face and back warp, 3776.

Filling. 56 picks per inch.

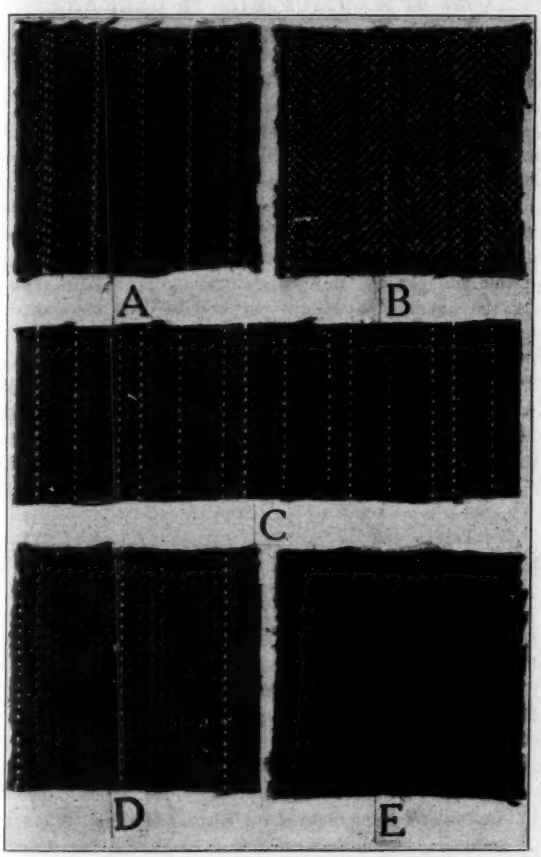
8-Black	2/26's
8-Black and Drab	2/30's
16	

See Fig. E sample of fabric. Analysis for this fabric is the same as the analysis for the light weight fabric, in regard to width in end, the ends per inch, and total ends in warp. The back warp, however, is composed of 2/20's

cotton instead of 2/30's cotton and only 56 picks are used instead of 60.

Calculation weight per yard 9.36 ounces. Finished weight per yard 9 ounces.

The back warp is sometimes made as near like the face warp as possible, as regards color arrangement, therefore care must be taken to get the corresponding colors directly over each other, and the beamer must start and finish both face and back warp alike. This is especially important if there is a break in the drafting, such as a backward twill or a basket stripe in the face warp; as the high colors in the back warp at these breaks is likely to show on the face of the fabric. If, however, a back is used as in the heavy weight fabric the twist thread should be made to come under twist threads of the face warp, otherwise it may be likely to show on the face of goods and mar the pattern.



BEAMING.

In two-warp fabrics when each warp has a different percentage of take up in weaving, it is advisable to use a separate beam for each warp, although these goods are, for economical reasons, sometimes, made from one beam only, the back warp threads in beaming are subjected to greater tension than the face warp. This extra tension, however, is not sufficient to make the fabric weave smoothly, and the result is that the back warp is inclined to curl when in the cloth. A much better fabric is obtained when the face and back warps are on separate beams—the fabric presents a more salable appearance.

LOOM REQUIRED.

These fabrics may be woven on any box harness loom. The loom, however, should have two beam stands. An economical plan is to use a broad loom and weave two widths at one time, by using a doup arrangement in the center of the loom and thereby operate the outside ends of the inner selvage threads which require about three-eighths of an inch space between the two widths so that in separating or cutting the goods the knife will not interfere with the douping threads.

FINISHING.

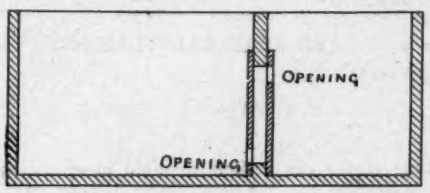
The process begins with burling, after which the goods are mended if necessary. For the next process, the goods are run through a tank of soap water in which they are shrunk to the desired width, after which they are run through the rotary press, the cylinders of which are heated with about 60 pounds of steam.

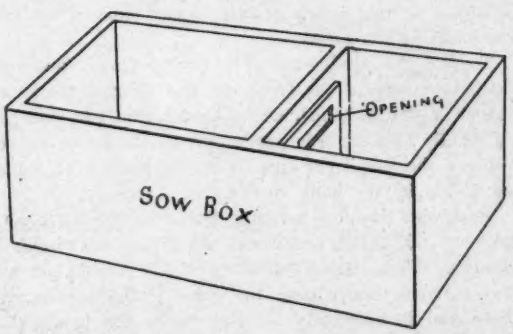
A SOW BOX.

For Sizing or Slashing Machines.

The illustration herewith is an English invention relating to sow-boxes for sizing and slashing machines.

It is a matter of considerable importance that the size in the sow-box of a sizing or slashing machine should be properly boiled or cooked, and that there should be uniformity in its application to the yarn.





At present, the sow-box is usually divided into two compartments, one larger than the other by means of a partition, which crosses the box. A small passage or space is left near the bottom of the box, so that the size, as it is fed into the box, passes through the first compartment, in which there is a perforated steam pipe for boiling the size, then through a small passage or space at the bottom of the partition into the larger compartment containing the immersion, sizing and pressure rollers, and in which there is also a perforated steam pipe for boiling purposes. The object of this indirect feeding of the size into the trough is to enable the size to be properly boiled, and in fit condition for sizing the yarn. This object is, however, only inefficiently attained, for the raw size entering the box, by reason of its greater specific gravity, falls to the bottom, and immediately makes its way through the passage into the larger compartment. The size is thus, not strictly speaking, throughout its entire bulk, of the same

specific density or consistency, the result being that the warp, especially in the case of heavy sizing receives more of its share in some parts and less in others.

The present arrangement is intended to insure equal distribution of the size over the surface of the yarn. For this purpose, instead of the passage or space at or near the bottom of the division wall of the size-box, a much larger hole is cut, preferably square, and this hole is covered by attaching to the division wall by means of nails, screws, rivets, bolts, or the like, two metal plates, preferably of copper. One of these plates is fixed against the division wall so as to cover the square hole on one side and the other on the other side. Prior to the plates being fixed to the trough, a horizontal slot is cut in the top of the plate, which is fixed on one side, and a similar slot in the plate, which is placed against the hole in the division wall on the opposite side of the sow-box, but close to the bottom instead of at the top of the plate. The size, before leaving one compartment and entering the other, is thus caused to rise to a certain level determined by the height of the slot in the plate, then has to pass down the passage or space between the two plates, before it finally emerges through the slot close to the bottom of the second plate, and enters the other compartment. In some instances, the box may be suitably constructed on these lines without the use of the metal plates.

CARD ROOM CALCULATIONS.

By James A. Greer.

Some of the calculations required in operating a carding department are not thoroughly understood, and it is the object of this article to make clear some of the intricate parts of the processes.

To find the production of a roving frame, instead of taking the speed of the front roll and figuring the amount of inches, yards, hanks, and pounds from this data, one can readily find the true production by the following rule: Multiply the hanks per spindle by the number of spindles and divide by the hank roving.

Example: Suppose a roving frame on five hank roving turns off 60 hanks per week, the frame containing 160 spindles. Then $160\times60=9600\div5=1920$ pounds per week. This is much easier than the older methods referred to above and is absolutely correct. Since the hanks shown on the indicator means the number of 840 yards, or hanks, that the roll has turned out, and by multiplying this by the spindle per frame gives the total number of hanks produced, and this divided by the hank roving, (hank roving simply means the number of hanks of 840 yards each that it takes to weigh one pound) gives the total pounds.

A constant number for production can be found very easily and is a convenient method for calculating the production. It is found by dividing the number of spindles on a frame by the hank roving being made.

In the former example, we used a frame of 160 spindles making five-hank roving. With the same data let us calculate the constant number. Rule: Divide the number of spindles by the hank roving being made. Then $160\div5=32$ the constant number.

To get the production from the constant number, multiply the number of hanks run, as shown on indicator, for any given time, by the constant number. Hanks run per week, $60\times32=1920$ is the production in pounds for said week.

This method of finding production will apply to any frame where an indicator is used to record the hanks. To say that such a roving is five hank roving is to say that five hanks of 840 yards each of such roving will weigh one pound. To refer to yarn as number 20's is to indicate that 20 hanks weigh a pound .

From the foregoing it will be clearly seen that, in order to determine the number of yards in a pound of any roving or yarn, it is only necessary to multiply the number of each roving or yarn by 840. For example: Number five hank roving would contain $840\times5=4200$ yards in a pound. Number 20's yarn would, by the same calculation, have $840\times20=16800$ yards in a pound.

COST OF A COTTON MILL IN GERMANY.

For a Spinning Mill the Cost is $13.09 Per Spindle.
For a Weaving Mill the Cost is $238 Per Loom.

For a cotton mill in Germany of 30,000 spindles to spin warp yarns of say 32/34 counts, and filling yarns of 42/45 counts, the cost of construction, without the ground itself, will range between $11.90 to $14.28 per spindle, complete. The cost will vary between these two extremes according to the outlay considered necessary for the house of the manager, the storehouses, and the accessories. Taking the average of $13.09 per spindle this amount will ordinarily be made up as follows:

Description.	Cost.
Spinning machinery proper	$ 5.95
Spinning accessories, cans, belting, etc.	1.19
Steam engine, lighting and heating equipment	2.142
Building and sheds	2.856
Miscellaneous expenses	.952
Total	$13.09

For a weaving mill of 500 looms the expense will be about $238 per loom.

Description.	Cost.
Looms	$ 95.20
Preparatory and sizing machinery, etc.	11.90
Steam plant, lighting and heating	59.50
Building	47.60
Miscellaneous expenses	23.80
Total	$238.00

In the foregoing figures the cost of the land is omitted as being too variable a factor to average, but for the ordinary German cotton mill located just outside of a town this might be estimated at 5 marks a square meter ($1.19 per 10.76 square feet).—*Consular Report.*

Within the mills of New England every condition of warp sizing is to be observed, from the almost obsolete practice of souring the starch to be used by allowing it to stand at soak in a large vat, down through innumerable changes of machinery—and variety of sizing ingredients—to the up-to-date processes and formulæ that are giving a high degree of efficiency at the minimum of expense in time and material.

Inquiries about anything pertaining to the textile business will be cheerfully answered by Cotton.

KNITTING

CIRCULAR KNITTING MACHINE.

An Infringement Case. Several Threads Fed at the Same Time to the Needles. The Pineapple Stitch.

A patent infringement case has recently been decided in the United States Circuit Court favorably to Stafford & Holt, Little Falls, N. Y., in support of the validity of their invention of a machine for producing what they call the "pineapple" stitch in underwear.

Because of the position that this machine holds in the estimation of the trade we give herewith illustrations of its principal features as they are presented in the patent. Fig. 1 is the style of fabric produced. Fig. 2 is a bottom view of the cam plate, showing the arrangement and construction of the cams. Fig. 3 shows the means employed for connecting the throat cams with a pattern mechanism.

The invention relates to improvements in circular knitting machines, and in the patent it is illustrated as applied to multiple-fed machines, that is, several threads are shown as being fed at the same time to the needles.

The particular purpose of the invention is to produce a circular-rib-knitting machine in which certain of the needles of one set, preferably, for instance the dial-needles, can be made, some of them, to knit plain, others to cause a tuck-stitch to be made, and some to skip the threads delivered from the same feed to such needles successively, and at the same revolution of the machine, and by which any number of such stitches may be produced at the same point, and by which the stitch may be changed from one to another kind or form at any point of the operation.

By a needle making a "tuck-stitch" or "welt-stitch," it should be understood as meaning that the needle is operated at that point in the operation, to tuck the thread or to skip the thread, though properly the stitch is not completed until combined with the succeeding plain stitch formed by that needle, i. e., the needle is operated to take a thread without casting its old loop or to miss the thread without casting its loop instead of casting an old loop over a new loop to form a plain stitch.

The following from the specifications summarizes quite well the salient features of the invention:

"Each throat-cam can be moved while the machine is at work by its own separate connection with its own pattern-chain and independently of each other throat-cam. As each needle comes to each throat-cam it may be projected so that it will cast off and make a plain stitch, or it may be projected a lesser distance and a tuck-stitch be made, or it may be withdrawn and not take thread and permit the making of a welt-stitch. These cams may be moved in unison and the needles against one set of cams all make the same kind of stitch, or the needles may be moved oppositely, and thus make different stitches, or some can be moved one way and some another, any one or more of the twelve throat-cams in any one of the three positions for any number of revolutions or part of a revolution of the machine. Each cam may be changed at any time in the operation to any one of its three possible positions. So, too, the needles operated by these cams may be arranged in any desired way or with any desired space between them, governed only by the radical spaces of the dial-plate. It will thus be seen that we have produced an improved machine in which the stitches formed by the needles may be changed in any desired manner by the disposition of the throat-cams during the operation of the machine, and it will be obvious that we have thus made it possible to produce fabrics of a very large variety, grouping the possible kinds of stitches according to any desired pattern."

Fig. 2.

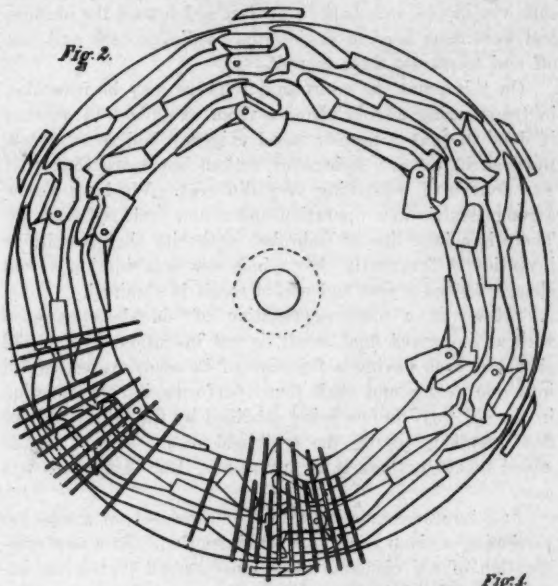


Fig. 4.

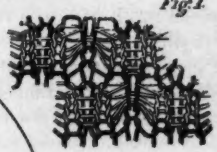
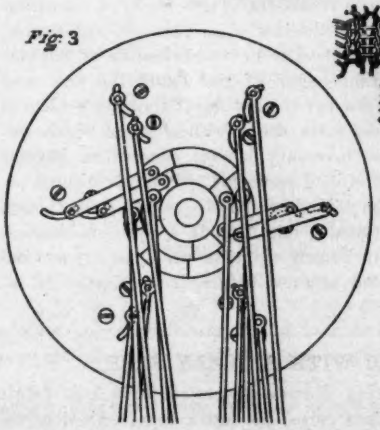


Fig. 3



This knitting machine produces a fabric known as the "pineapple" pattern which had not been made before, and which it is claimed is impossible to make on any other machine of the circular-knitting variety. It was conceded in the trial of the case that the various elements of the device or machine are old, but it was insisted that this is a new combination with novel features producing both a new result and some old results in a new and far better way. It may be said that it is "an old and a crowded art." This fact, in the opinion of the court, did not detract from the merits of the patent, for to produce a new and useful result from a new combination of old elements demands, oftimes, a high degree of skill and mental conception.

The prominent new feature in the patent and invention consists in the independent operation of the various swinging throat-cams at the right instant and at the right point for producing the pineapple stitch, an entirely new stitch in a rotary knitting machine. In this art we have stationary head machines and the rotary head machines.

Mere mechanical skill was not adequate for the undertaking. There was a mental conception with which was combined and utilized mechanical skill to provide means for carrying out and making useful this conception.

The throat-cam itself was old before this invention, and these throat-cams were in use in a machine having a single cam way or cam race both to project and retract the needles, and were there used to project the needles to tuck and cast off and to retract them to welt.

On this point the court said: "There may be invention in transferring an old element from one place to another if done to meet a new or novel exigency and serve a new purpose in its new sphere of action, but more than that was done here, something very different. We have a new arrangement, a new operation and a new and useful result. There is a long line of unbroken authority that patentable invention is frequently shown in a new combination of old elements when a new and useful result is obtained.

"However, a mere aggregation of old elements, even with an improved final result, is not invention. When old elements, each having a function of its own, are assembled into one device and each there performs its old function in the old way, no one being qualified by the other, and the final result is simply the combined result, several results added together, there is no invention. But that is not this case.

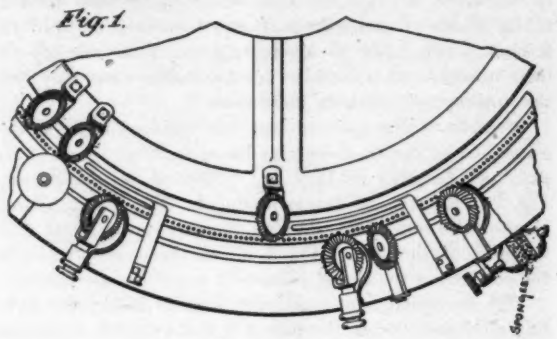
"All improvements in devices, or processes, or means for producing a given result, are not invention. In a new combination of old elements there must be not merely an improved result of a new result, but a new mode of operation as well, and this should disclose more than the application of mere mechanical skill. The new combination of old elements, the new arrangements of parts and the new and beneficial result are not per se, invention; they are evidences of invention. These facts are evidence from which the courts may find the necessary mental conception, beyond the province of the skilled mechanic, which constitutes invention. It may be laid down as a general rule, though not perhaps an invariable one, that if a new combination and arrangement of known elements produces a new and beneficial result, never attained before, it is evidence of invention."

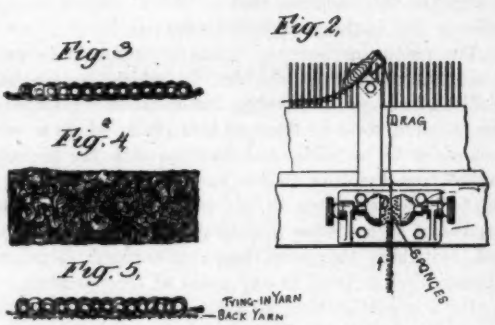
FABRIC WITH A CURLY FACE.

The accompanying illustrations relate to a knit fabric having back and face yarns, the latter being united to the former at intervals by a tying-in yarn. The face yarn is curled prior to the knitting operation so as to produce by the knitting operation itself a fabric having a mass of closely and uniformly disposed rings or curls over its entire face.

Fig. 1 is a plan view of a portion of a knitting cylinder employed in the manufacture of the fabric; Fig. 2 a side view of a portion of this cylinder to illustrate the manner of introducing the face yarn, the needles being spaced apart for the sake of clearness; Fig. 3 a view of the face yarn as it comes from the curling machine; Fig. 4 a face view of the finished fabric; and Fig. 5 a section thereof.

In making the present fabric the operator proceeds as follows. The yarn which is to constitute the face is first run through a curling machine to produce a yarn having a succession of substantially uniform rings, curls or loops as indicated, for example, in Fig. 3, the rings of curls being regular in form and closely disposed. The degree of the curl may vary, the essential feature being that the face yarn shall be curled in a certain manner as to produce the desired effect for the face of the fabric; that is, the finished fabric shall present on its face a close, compact mass of rings or curls.





It is impossible for the above described curled yarn in its normal condition to pass through the backing wheel and in order that the yarn may be properly placed upon the needles it is necessary that it be straightened, and for such purpose any form of tension device is employed suitable to the yarn and the conditions obtaining in the knitting operation. The tension device preferred comprises two sponges supported in cups, the latter being carried upon threaded studs adjustable in brackets on a base, the latter being secured to the machine frame in proximity to the backing wheel. The sponges are saturated more or less with some suitable oil such as olive oil, and are so adjusted relatively to each other that as the curled yarn is drawn between them the drag or tension placed thereon will be sufficient to straighten the yarn as indicated in Fig. 2. The yarn is thus made practically straight between the tension device and the backing wheel, but as soon as it leaves the latter the normal curled condition is resumed. The presence of the rings or curls in the face yarn after being placed on the needles does not interfere with the subsequent stages of the knitting operation, the yarn being acted upon by the several wheels of the feed called into play after being placed upon the needles, and bound to the back yarn by the tying-in yarn, in the usual manner for a straight yarn.

The trade is aware that previous to this invention a knit fabric has been made in which the face yarn as it appears in the fabric on the knitting cylinder has a wavy ap-

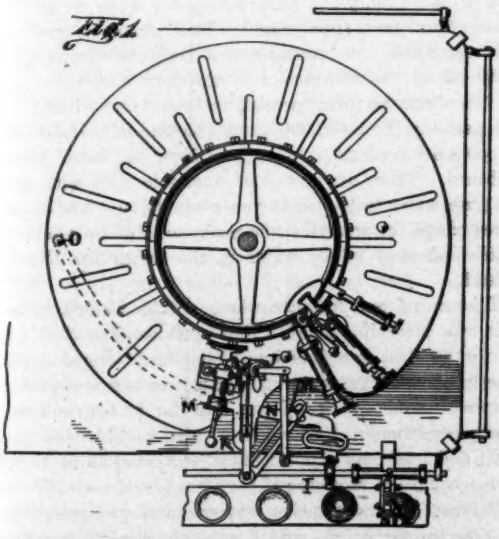
pearance, the front and back yarn being of different materials in order that the back yarn may shrink, while the face yarn does not, certain finishing operations being relied upon to give more or less curl to the face yarn. In making that fabric the face yarn is not curled previously to the knitting operation so that it is claimed in the finished fabric the rings or curls are in a more or less incomplete condition and not uniformly or evenly distributed, open spaces of greater or less extent exposing the back. By curling the face yarn prior to the knitting operation a fabric is claimed to be obtained on the knitting cylinder in which the curls are of substantially uniform height, approximately regular in form, and so close together that the back is not materially exposed.

After removal from the knitting cylinders the fabric is put through the finishing operations of dyeing, washing, singeing, and shearing, but these operations are not relied upon to produce the curled face effect of the fabric.

It is claimed that a very distinct and important advantage results from the use of a previously curled yarn in that the rings or curls become set in the yarn prior to the knitting operation and are thus not liable to uncurl or assume an abnormal condition in the finished fabric.

AUTOMATIC STOP MOTION.

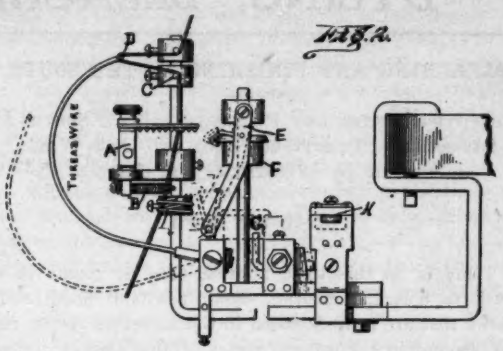
The object of the device herewith illustrated is to provide a stop motion, simple and durable in construction, efficient and automatic in operation, and specifically designed to prevent large knots, imperfectly twisted yarn and bunches of loose material on the bobbins from passing into the knitting machine, thus overloading or choking up the needles and causing breakage of the latter, and other injury.



The device also operates to stop the machine in case of breakage of the yarn, or through the end of the yarn on the bobbin having been reached.

Fig. 1 is a plan view of one end of a knitting machine showing the device; and Fig. 2 is an enlarged side elevation of the tripping mechanism.

This automatic stop motion is applied to a knitting machine of the ordinary or any preferred construction. Its operation is as follows:



The thread or yarn being properly arranged, the brake is pulled back and set, the stop motion slide set, and the belt thrown to the fast pulley, whereupon the knitting proceeds uninterruptedly as long as the thread wire is held in the full line position shown in Fig. 2. Should the thread be broken or be entirely unwound from the bobbin, the wire will be released, assuming the dotted line position. The same result is accomplished whenever knots, tangles, or flaws in the yarn reach the waste stripper, whereupon the stripper is pulled upward, rocking the yoke *A* so as to clear a pin, and thereby permitting the spring *B* to rotate a stripper so as to release the yarn from the arm *C* of the arm *D*. The dropping of the thread wire tilts a lever *E*, thus releasing a weight, which immediately drops on to an upwardly extending arm *G* of a trigger, thus tilting the same so as to release a collar and allow it, together with a slide *H*, to be shifted laterally by means of a spring. This lateral movement acting through a shaft *I* and its connections, rocks the shaft *J*, thus releasing a bell lever arm *K* and allowing it to be thrown upward under the influence of a spring *L*. The arm *K* through contact with the arm *M*, on the brake, releases a notch from its engagement with a lug, thus permitting a spring to act to set the brake. Simultaneously with this action, the lever *N* is shifted, and through the shaft *O* and arm, the belt is shipped to the loose pulley.

A positively acting device is thus obtained, which is entirely automatic in action, and which will detect any flaw in time to prevent damage to the material knitted, or to the machine. In addition to the great saving in value of the finished product and in the cost of maintenance and repairs to the machine, through being entirely automatic, it enables one operator to attend to a number of machines, thus effecting a substantial saving in the cost of labor.

ATTACHMENT FOR WARP KNITTING MACHINE.

There has recently been invented an attachment for that class of knitting machines in which reciprocating or shifting thread guide bars are used, pertaining to the means for locking the bars in their adjusted positions.

The especial object of the improvement is to provide easily operated devices which will positively lock the thread guide bars against endwise movement after each shifting operation, thus avoiding the accidental displacement of the bars which sometimes occurs where they are locked merely by frictional engagement. It is applicable to any form of knitting machine in which thread guide bars are employed.

COTTON is the leading textile paper in the South.

DYEING, BLEACHING AND FINISHING

BLEACHING AND FINISHING IN THE SOUTH.

THE OPPORTUNITIES AND FACILITIES IN THE SOUTH ARE FAVORABLE. PLENTY OF GOODS AND GOOD WATER. PROFITABLE INVESTMENT FOR CAPITAL.

BY HENRY ROWE.

There is, at this time, a great need of plants in the South to bleach, mercerise, dye, print and finish cotton fabrics that are manufactured in the numerous cotton mills that abound in the several States of this section. There are only two moderately sized plants at this time which do a commission bleaching and finishing business for converters and these are fitted up only to do a certain grade of goods. There are, however, several small plants that are connected with mills and fitted up to finish their own particular grade of goods which they manufacture. Some reader may ask the question, are such plants a paying investment? I answer yes, if the plant is laid out as it should be and properly managed; it will make splendid returns for the investor. In fact, no better investment could be made in any other branch of the textile industry. Another question might be asked, is there work or goods enough to be had to keep any more of these plants fully occupied? I answer yes, enough to keep many large plants fully occupied.

For instance, every pair of shoes manufactured in the United States has more or less of a cotton lining, and fully three-fourths of all these goods are manufactured in the cotton mills of the South, and seven-eighths of them are finished in Massachusetts and New Hampshire bleacheries, and then a good portion refreighted back to Southern shoe factories. Just think what a business this is. I say every yard of this cloth should be finished in the South where it is manufactured, and then sold not only to the shoe factories of the South, but to those of the East and West. The question may now be asked, can these goods be finished as well in the South as they are in the East? I answer they certainly can, and the men are right in your midst that can do it.

Again, Southern mills are now making large quantities of table damasks, and every yard is sent to Eastern bleacheries to be bleached, mercerised and finished, and a large portion reshipped to the South to cover the dining tables of its people. Why not keep the money spent in freight and having the goods finished in the East, among the people of the South, to employ home people to do this work? These goods can be finished in the South as well as they can be in the East. Then there are large quantities of other goods such as shirtings, sheetings, drills, sateens, long cloths, nainsooks, print cloths, etc.

The South has made rapid strides in cotton manufacturing in the past twenty-five years, and her manufacturers are now awakening to the fact that most all women and children, for a large portion of each year, wear white or printed dresses, and that the time is fast approaching when most of these needs must be supplied from their own mills. Then why not have finishing plants not only to finish what is made at the present time, but what will be made in the near future? I know there are doubting Thomases, who will say the South can never manufacture fine goods.

Some years ago statements were freely made in England that America could never make fine fabrics, but the mills of New England have proved that it can be done, and the same thing will be repeated in the South; for the time is fast approaching when Southern mills will be making fine fabrics the same as the New England mills are making to-day, and the latter will then be making the very finest fabrics which are now imported from England, France and Germany.

What will it mean when the South can finish, dye and print her own goods? It will mean that other industries will spring up in our midst such as shirt factories and shirt waists and wrappers, and barbers' and butchers' coats and aprons will be manufactured, which goods are now shipped from the East and middle West. All these goods that are used by our people should be made here, but not until we have the plants to finish the fabrics can we expect them, for the manufacturers of such articles want to be as near as possible to where they can obtain the finished goods they require.

I know the statement has been made very often that there is not suitable water in the South for bleaching and finishing purposes. To this I say the ones making such statements don't know what they are talking about. For instance, as an illustration as to whether there is water in the South suitable for such plants, let me tell you that there is one river in western North Carolina that can be used eleven months each year with as clear and pure water as need to be for such purposes, and water enough to bleach and finish 1,000,000 yards of cloth per day, or one hundred and twenty-five tons, basing the work on an average of four yards per pound. This means a good deal when one takes into consideration that the computed capacity of all the bleacheries in the New England States, not including the print works, is four hundred and fifty tons per day, or 3,600,000 yards, basing it as four yards per pound. And then to say we have no water suitable is absurd. There are scores of available sites with ample and pure water to be had for such plants, and lots of other places where the water can be made suitable by filtering it. So the old bogy of no water in the South for bleaching is dead.

I know of one instance where a firm wanted to build their own bleaching plant. They were sending their product to the East for finishing. They had several so-called experts examine the water on their premises and each and everyone condemned it. I was sent for to test and report on the conditions. I found the water suitable and plenty of it, and made my report; but it is a hard thing to make people believe in anything if they have been told differently by others. So my decision was criticised very severely by the officers of the firm, and I was compelled to bleach several small lots of goods by hand before I could convince them. They put me in mind of the doubting Thomas that had to see the imprints of the nails and put his hand in the hole in Christ's side before he would believe that it was He who had been crucified. Well, the bleaching plant was built and is turning out just as good work as any in the United States, and has made nice profits for the shareholders.

Now there is no question about the water or about getting goods enough, the only thing that is needed is for some capitalist to come forward with money enough to build and equip a first-class plant to do any grade of goods that is made, and have the plant laid out in such a manner as not to have one-third of the help or labor trucking goods around from place to place when all that can be avoided. When this is done and the plant is properly managed it will make handsome returns to the investors.

MERCERISING.

COTTON YARN AND CLOTH. CHEMICAL AND MECHANICAL ACTION NECESSARY FOR LUSTER. MERCERISED COTTON THREAD BEING SUBSTITUTED FOR SILK. HOW MERCERISATION IS DONE.

BY H. R. CARTER.

The process of mercerising was originally invented about the year 1844 and patented about the year 1850 by John Mercer, a printer and chemist of Blackburn, England. This man was the first to notice the peculiar effect of concentrated solutions of caustic alkalies on cotton. He noticed the fiber swell, become cylindrical and semi-transparent and the almost total obliteration of the cell walls by the swelling. He noticed also a marked gain in weight and strength, and a material increase in the affinity of the fiber for coloring matter.

For various reasons, such as imperfect applications and development of the process, mercerising at first attracted but little attention and it was not until within recent years that the process attained any degree of commercial success. The mercerising of cotton is now, however, such a successful process that the lower qualities of silk goods have been put out of the market by mercerised cotton goods.

A large proportion of embroidery cotton, crochet cotton and sewing cotton is now mercerised. Dressmakers and milliners find that mercerised cotton thread is suitable for most purposes for which they previously used silk. The best results in mercerising are obtained with combed Sea Island cotton and with well-selected combed Egyptian cotton.

In the process as now practiced, cotton yarns and fabrics have imparted to them a durable luster which makes them look like silk. This luster is produced by subjecting the cotton simultaneously to the chemical action of caustic alkalies and the mechanical action of strong tension, sufficient to prevent contraction.

Single yarns are seldom mercerised as they will not stand the strain necessary for the production of a good luster.

Modern mercerising consists briefly in impregnating cotton yarn or cloth with a rather concentrated cold solution of caustic soda and subsequently washing out the caustic liquor with water, the material being either held in a state of tension during the time it is treated with the caustic alkali in order to prevent contraction, or stretched back to its original length after treatment with the alkali, but previous to washing. In either case, the material must be in a state of tension during the process of washing.

There are two separate phases of the mercerising process represented in the above operations which must be separately understood in order to comprehend the exact nature of the change which takes place in the appearance of the fiber. The one is the chemical action of the caustic soda and the other is the mechanical effect brought about by the tension. The action of the caustic alkali is to effect a chemical transformation in the substance of the fiber, a further chemical reaction taking place when this product is treated with water.

Yarns and cloth for mercerising and bleaching are generally mercerised in the unbleached condition.

All yarns for mercerisation should be specially spun and doubled with the least amount of twist in that will answer the purpose for which the yarn is to be used. The less the twist, the greater will be the luster of the yarn, and the better the cotton, the less the twist that may be put in. For most purposes the yarn may be spun with four times the square root of the counts for turns of twist per inch. Doubled yarns may also have a number of turns per inch twist found in a similar manner.

If the best results are to be obtained, yarn should be gassed before mercerisation to take off the loose fibers.

Before mercerising the yarn should be well boiled in a closed boiler for four hours at not more than five pounds of steam pressure. It must then be well washed off in cold water until all impurities are cleared away when it may be passed through the hydro-extractor.

Hank mercerising machines have been brought to a high state of perfection and are generally automatic in their action. One of the newest consists of a central shaft running in bearings in a pair of gables. Around the central shaft are grouped six pairs of rollers. One roller of each pair is smooth while the other is fluted. The former are driven by means of chain gearing, while the friction of the yarn on the fluted roller gives it a rotary motion. Each roller is supported firmly by bearings at one end only, the other end being unsupported so that the tanks may be slipped on and off as desired. In order that the tension of the yarn between the two rollers may be regulated to suit tanks of different lengths, the fluted rollers are connected to an adjustable lever. By this means each pair of rollers may be brought nearer together or placed further apart to meet requirements. A tank containing the caustic lye is placed underneath the rollers and two pairs are immersed in the mercerising liquid. At the same time new caustic lye is sprayed on to the yarn through perforated pipes. The yarn is then squeezed to remove the surplus liquor and afterwards washed. A water tank is placed underneath the two upper pairs of rollers in order that the waste water may be collected. This tank is divided into two parts, one for hot and the other for cold water; and supply pipes are located above the upper rollers for the purpose of replenishing the tanks. After being squeezed, the yarn passes through the warm water tank and the caustic lye that remains on the hanks is quickly removed when the hank is revolved. By this means the bulk of the caustic lye is contained in the wash liquor which is carried to the storage tank and thence to the soaking tank underneath the two lower rollers. Owing to this provision the new alkali passed into the tank by the pipes is reduced in strength to the required degree. This wash liquor is, however, only that portion used during one revolution of the hank in the warm water, so that after the first revolution, the draining pipe is automatically closed and the rest of the wash liquor allowed to pass into the drain. The overflow from the lower, or soaking tank is pumped automatically to the storage tank above the machine from

which it is fed to the perforated pipes for spraying the hanks on the two pairs of lower rollers. By means of this continuous circulation of the caustic lye the strength and temperature of the mercerising liquor are kept uniform.

The central shaft gives motion to the six pairs of rollers which are thus rotated about the central shaft. Each pair of rollers makes one-sixth of a revolution in one minute, so that one complete revolution of the whole of the roller is made in six minutes and so six distinct movements are made.

By this means five sets of hanks are in different stages of the mercerising process, while one pair of rollers is having the hanks removed and a fresh supply placed on them. The complete cycle of operations is as follows: 1. The rollers are loaded. 2. The yarn under ordinary tension is immersed in the mercerising liquor. 3. The yarn remains in the mercerising liquor, but under increased tension. 4. The surplus liquor is squeezed from the yarn by rubber rollers and an extra tension of one per cent. given. 5. The yarn, under an extra tension of 3 to 4 per cent. is passed through warm water. 6. The yarn, under the same tension, is passed through cold water.

Upon the succeeding movement of the machine the hanks are brought to their initial position from which they are removed. It will thus be seen that the entire process occupies six minutes, and as each pair of rollers is loaded with two pounds of yarn, this gives a production of about 1200 pounds per day.

(*To be continued.*)

GASSING MACHINE.

FOR YARN AND THREAD.

The apparatus here illustrated relates to the burners of gassing machines for yarn or thread, with the object of economizing gas, giving a steadier singeing effect to the yarn, and carrying away the dirt or dust and products of combustion coming from the thread and from the flame and so prevent the atmosphere of the room in which the machine is installed from being vitiated.

Heretofore attempts have been made to collect and suck away the dirt or dust and the products of combustion coming from the yarn and from the flame by placing a hood or the like above or adjacent to the burner. The movement of the yarn, however, and drafts produced by other causes act to carry much of the dust and products of combustion into the room.

The present device consists in projecting the flame from a burner into a tube and causing the yarn to pass along the tube, means being provided for exhausting the contents of the tube and inducing a current of cool air along one end of the tube.

Figure 1 is a sectional elevation of a burner, porcelain tube, thread guides, and other accessories, constructed and arranged in one convenient form. Fig. 2 is an end elevation of the same. Fig. 3 is a cross section on the line A B of Fig. 1. Fig. 4 is a diagrammatic view showing the manner in which the thread is guided off a cop and through a tube of refractory material.

The tube *a* conveys a mixture of gas and air to the jet burner *b*. The tube *a* is supplied with a mixture of air and gas, which mixture is preferably arranged to have too small a proportion of air to be an explosive mixture. The burner is arranged to give a long flame and to project this long flame into the hole *c*, in the porcelain tube *d*. This porcelain tube is inclosed in a metal tube *e*. The porcelain tube is formed with a slit *f*; and the metal tube with a slit *g*.

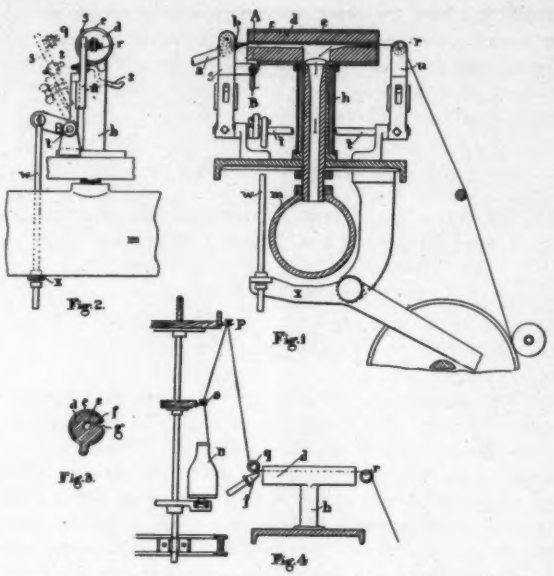


Fig. 2. Fig. 1. Fig. 3. Fig. 4.

The thread coming from the cop *n* (see Fig. 4) passes through an eye *o* and another eye *p*, and then descends and passes round a pulley *q*, through the porcelain tube, over the pulley *r*, and then to the bobbin or tube on which it is being wound. The pulley *q* is mounted on the upper end of an arm *s*, which is rigidly secured on a shaft *t*. The pulley *r* is carried on the end of an arm *u* which is also rigidly secured on the shaft *t*. This shaft is adapted to be given an angular movement by means of a crank. The lever is adapted to be operated by hand so as to swivel the arm *s* from the position shown in full lines in Fig. 2 to the position shown in dotted lines and vice versa and to swivel the arm *u* correspondingly. When the arms are in the positions shown by full lines, the thread is stretched through the hole *c* in the porcelain tube and, when the arm *s* is in the position shown by dotted lines, and the arm *u* is in the corresponding position, the thread is clear of the porcelain tube. The thread enters and leaves the porcelain tube by way of the slits *g* and *f* in the metal tube *e* and the porcelain tube.

A draft in the main exhausting flue *m* is produced by any suitable means so as to suck the products of combustion and the dirt and charred matter which comes off the thread down the tube *h* into the main exhausting flue. This main exhausting flue is arranged to discharge its contents in any convenient place. The contents may be discharged into water or the solid matter precipitated onto a traveling band which may carry it away.

The ordinary bleaching process may precede mercerisation when a more or less faintly harsh handle is desired.

Concrete is an excellent material for fire-resisting work in general, when due precautions are exercised in its use and the right type selected.

Loose yarn mercerised without any stretching, whether long or short stapled, and whether with or without a hard twist, has less luster than unmercerised yarn.

MARKET REPORTS

KNIT GOODS MARKET.

The knit goods market is so inter-related with the yarn market that whatever may be said in relation to the conditions prevailing can readily be deciphered in the report of the latter. There has been a conservatism existing in this market throughout the past month, and no orders have been placed more than to meet immediate wants, and nothing is being done in anticipation of a future demand, for this is still problematical, and trade is not sufficiently settled to warrant anything that anticipates what may be called for. Jobbers are fully aware of the fact that the fall season is now upon them, yet they do not know which way to turn, and are therefore giving their orders sparingly and to this extent conforming their own business to the conservative character of their environments. Some orders that were long delayed are now coming forward but not in sufficient volume to make an impression of any moment. Goods are now recognized as being about as low as it is possible to get them, and yet this does not seem to stimulate any trade, for it is not a question of price so much as that of demand. Manufacturers are determined that they will not make goods and sell them at a loss for rather than do this they will run their machinery at as low a point as it is possible and still keep their mill in operation. Some buyers show a disposition to hold off in placing their orders with the expectation that prices will be lower, but it is our impression that they will be disappointed. Still there is nothing to stimulate the wants of buyers as they have nothing in prospect for disposing of their purchases. The buying for next spring is very limited and nowhere near up to the normal standard. When buyers enter the market they seem to be more on looking at what is to be found and informing themselves at what price goods can be bought rather than in placing any orders.

COTTON YARN MARKET.

At the beginning of the month under review the cotton yarn market was gradually getting into its former position of more activity, and buyers were picking up good sized lots in many instances and paying approximately full asking prices. The decline in the price for cotton seemed to have little or no effect on the yarn market though buyers were using it as an argument to force concessions from sellers, and in some instances they were successful to the extent of shading values from ¼ to ½ cent per pound below quotations. These instances, however, were exceptional, as spinners then, as now, maintained their prices steadily, and demanded at least a profit of some dimension, otherwise they refused to part with their product. The Southern spinners have shown a strong disposition to curtail production and not operate their mills unless they could secure a fair margin of profit on their yarns, and buyers are beginning to realize that spinners are determined and are in a position to enforce their determination. While the majority of Southern spinners are holding to their mutual agreement to curtail production, and maintaining prices at a reasonable value, we learn upon authorities of more or less reliability, that some have secretly or otherwise disposed of yarn at less than quotations. These instances, however, we believe to be rare exceptions.

July opened with buyers showing much more interest in the yarn market than for some time previous, and some orders were placed for August, September and even October deliveries, though in most cases, the orders were for two-ply skeins and warps in the lower counts.

Toward the close of the month the cotton yarn market showed a disposition to be more or less irregular and some consigned yarns were placed, we are informed, at prices less than the generally accepted market value. This irregularity was also due in part to the breaking away of some spinners from their agreement not to sell their product at an under price.

We quote as follows:

SOUTHERN SINGLE SKEINS.

4s to 8s	15½@16	22s	18½@19
10s to 12s	16	26s	21
14s to 16s	16½@18	30s	21 @22
20s	18½@19		

SOUTHERN TWO-PLY SKEINS.

4s to 8s	16 @16½	30s	20 @21½
10s to 12s	16½@17	36s	23 @24
14s	16½@17	40s	25 @26
16s	17 @18	50s	33 @35
20s	18½@19	60s	38 @40
24s	19	3-ply 8s upholstery	17½@18
26s	19 @20	4-ply 9s upholstery	17½

SOUTHERN SINGLE WARPS.

8s to 10s	16½@17	22s	19
12s	17	26s	20
14s	17 @17½	30s	21 @22
16s	18	40s	26 @27
20s	18½@19		

SOUTHERN TWO-PLY WARPS, ETC.

8s to 10s	16½@17	26s	21
12s to 14s	17½@18	30s	22
16s	18 @18½	40s	27
20s	19 @19½	50s	35
24s	20 @ 0½		

SOUTHERN FRAME PEELER CONES.

8s	17 @17½	20s	18½@19
10s	17 @18	22s	19 @19½
11s	18	24s	19 @19½
12s	18	26s	19¼@20
14s	18	30s	20 @21
16s	18¼	40s	21 @21¼
18s	18½		

NEW ENGLAND MILL STOCKS.

	Bid	Ask.		Bid	Ask
Acushnet Mills	300	—	Manomet Mills	105	—
Androscoggin Mills	155	160	Middlesex Co	35	40
Bristol Mfg. Co	110	112	Nonquitt Spinning Co	100	101¼
Butler Mills	—	123	Page Mfg. Co	105	—
City Mfg. Co	185	—	Pacific Mills	2725	2750
Cocheco Mfg. Co	250	260	Pierce Mfg. Co	305	—
Dartmouth Mfg. Co	220	—	Potomska Mills	119	—
Gosnold Mills pf	95	—	Soule Mills	125	129
Grinnell Mfg. Co	170	180	Taber Mill	—	100
Hathaway Mfg. Co	—	—	Wamsutta Mills	—	125
Kilburn Mill	123	—	Whitman Mills	128	—

Carbon bisulphide has also been proposed as an assistant to mercerisation, in this case for enhancing the lustre.

A size to be effective must lay thoroughly the loose fiber of the yarn—materially increase its tensile strength—and at the same time render it sufficiently pliable to minimize its resistance to the chafing parts of the loom.

SOUTHERN COTTON MILL STOCKS.

Quotations by F. C. Abbott & Co.,
Charlotte, N. C.

	Bid	Asked		Bid	Asked
Aiken Mfg. Co.		91	Langley Mfg. Co.	96	...
American Spinning	150	...	Linden, N. C.	...	125
Arkwright Mills	112	...	Limestone	145	161
Arlington	165	...	Loray, pref 1901	...	98
Avondale	...	...	Lowell	190	...
Augusta, Ga.	...	71	Mooresville, N. C.	...	136
Bonnie	121	...	Lumberton	...	198
Bloomfield	...	118	Mills Mfg. Co.	100	105
Brandon Cot. Mills	120	...	Modena Mills	...	...
Brookside	...	151	Mollohon	...	...
Capitol City, pref.	...	96	Monarch, S. C.	100	104
Clara	...	126	Newberry	...	146
Clover	150	...	Nakomis N. C.	...	156
Clinton	...	136	Olympia, 1st	...	67
Clinton, pref.	...	103	Ozark	...	151
Cliffside	155	...	Patterson	...	150
Chiquola Cot. Mills	124	...	Piedmont Mfg. Co.	...	176
Cherokee Mfg. Co.	150	...	Pelzer	160	...
Converse	112	117	Pell City, com.	...	95
Dallas Mfg. Co., Ala.	...	100	Pell City, pref.	100	...
Dilion	60	68	Saxon	...	...
Efird, N. C.	133	...	Sibley, Ga.	...	65
Emira, pref.	100	101	Social Circle	...	90
Eagle & Phoenix	...	127½	Spartan Mills	...	...
Easley	...	150	Springstein	...	...
Edenton, N. C.	...	...	Statesville Cot. Mills	...	111
Exposition	...	...	Trenton, N. C.	...	...
Fairfield	70	...	Tryon, N. C.	...	143
Florence, N. C.	...	135	Tusacrora	115	...
Gaffney Mfg. Co.	70	...	Tucapau, S. C.	200	...
Gaston	...	111	Toxaway	...	93
Gainesville	...	61	Union Buffalo, 1st pref.	55	66
Gibson	100	101	Union Buffalo, 2d pref.	...	19
Graniteville, S. C.	...	165	Victor Mills, S. C.	...	128½
Gray Mfg Co.	...	126	Warren Mfg. Co.	80	...
Grendel	...	119	Washington Mills	95	...
Greenwood	97	...	Washington Mills pref.	...	112
Highland Park	107	...	Watts	101	106
Hartsville pref.	100	...	Wareshoals	62½	...
Hartsville	...	...	Whitney	...	125
Inman Mills S. C.	101	107	Wiscassett	120	...
Kesler	...	140	Woodside	104	111
Jno. P. King Mfg. Co.	...	99	Woodruff	121	...
Lanaster, com.	117	...	Williamston	105	111
Lanett	...	...			

NEW COTTON PICKER.

The Vacuum Cotton Picking Machine Co., of St. Louis, has been incorporated under the laws of Missouri, to manufacture and place on the market a mechanical cotton picker, operated by compressed air.

The company has a capital stock of $750,000. Its head is John S. Thurman, president of the General Compressed Air & Vacuum Machinery Co., St. Louis, whose patented devices for cleaning carpets and furniture by compressed air and vacuum systems have achieved success in the last 10 years. The latter company recently began the erection of a new factory and machine shop plant on South Jefferson Avenue.

The cotton picker is Mr. Thurman's invention. With it he expects to revolutionize the cotton-growing industry throughout the world, by making possible an immense saving in the cost of marketing that staple annually—a saving that will amount to millions of dollars by economy of labor in cotton picking as well as eliminating the waste in gathering the crop by hand. It is claimed that each hose driving a single picker tool operated by one man will do the work of seven hand pickers; that one man can empty 60 bolls a minute, and that the largest size, an eight-operator machine, will pick 480 bolls per minute.

The dyeing of Turkey red by the old or emulsion process represents in the truest sense the art of dyeing.

Subscribe to Cotton. $2.00.

NEW MACHINERY AND TRADE NOTES.

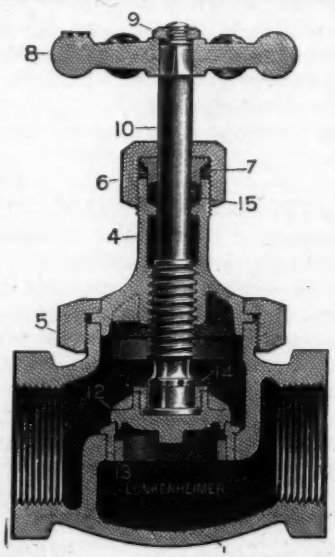
RENEWABLE SEAT REGRINDING VALVE.

The Lunkenheimer Company, Cincinnatti, Ohio, have designed the valve shown in sectional view herewith for the benefit of the trade preferring a renewable seat regrinding valve.

This valve differs from the Lunkenheimer regrinding valve only in the construction of the disc and seat. The disc 12 is provided with a projecting ring, which enters the valve seat ring 13. Its principal function is the preservation of the seat, which is accomplished in a two-fold manner. First, as it enters the cylindrical part of the seat it deflects the current of steam from the seat ring face, thus preventing the wire-drawing which would otherwise occur. This feature is especially important should the valve be left partly open for any length of time. Secondly, the seating surface is kept free from scale and grit by the action of the thin current of steam discharged over it as the disc is brought home.

Another function of this ring is the prevention of water-hammer which is caused by the sudden admission of steam, for it will readily be seen that no matter how quickly the hand wheel may be operated, the flange will only permit the steam to enter gradually.

The seat 13 is renewable and can be removed from the valve body by using a flat bar to engage the lugs on the inside of the ring. Particular attention is called to the fact that the seat may be reground a number of times before it is necessary to renew it. Not only is the seat renewable, but all of the other wearing parts, including the disc, can be renewed if necessary. The hub is securely held to the body by means of a union ring, owing to which it is impossible



for the hub and the body to become corroded together, as the thread which holds the union to the body is protected at all times from the action of the steam, the joint being made between the flange on the hub and the neck of the body. This connection also acts as a tie or binder in screwing over the body, and tends to strengthen the valve. The stuffing-box can be repacked under pressure when the valve is wide open, as a shoulder on the stem, directly above the threads forms a seat beneath the stuffing box. All valves above the ½ inch size, have a gland follower in the stuffing box.

NECKTIE MACHINE, made by James Taylor, Philadelphia. This machine will knit mercerized cotton, wool, worsted, silk, or wood-fiber silk. It produces a seamless tubular webbing, either plain or with a variety of fancy tucked stitches, and with or without stripes or cross-bars in two colors. It will knit neckties by the mile, and the only finishing required is to close the two ends and press them. The action of the machine is entirely automatic, not only for the striping but for the narrowing of the neckband, and measuring its lengths. The operation of the machine is very simple. Each machine is capable of making ten dozen neckties per day of ten hours, and one skilled operator can attend to ten or twelve machines. The cylinder and needles revolve, and the cams and bobbins are all stationary. They are made of any gauge or width desired.

THE TECHNICAL PUBLICITY ASSOCIATION. At the annual meeting of this association the following officers were elected to serve during the ensuing year: President, C. S. Redfield, advertising manager, Yale & Towne Mfg. Co., N. Y.; first Vice-President, Rodman Gilder, publicity manager, Crocker-Wheeler Company, Ampere, N. J.; second Vice-President, C. N. Manfred, manager advertising department, H. W. Johns-Manville Co., N. Y.; secretary, H. H. Kress, publicity department, A. S. Cameron Steam Pump Works, N. Y.; treasurer, H. M. Davis, advertising manager, Sprague Electric Co., N. Y. Members of executive committee, F. H. Gale, charge of advertising, General Electric Co., Schenectady, N. Y., and C. W. Beaver, special representative, Yale & Towne Mfg. Co., N. Y. Twenty new members have joined the association since the last annual meeting.

LAGONDIA MANUFACTURING CO., Springfield, Ohio.—The Weinland ball and thrust bearing cleaners equipped with the Wing head are fully described in a new 36-page catalogue which will be sent by this company to those interested. These cleaners are now being furnished with a new type of head which promises greater efficiency than possible with the former construction. The prominent feature of this head is the large number of cutter wheels swinging on crosswise arms and so mounted that the cutting wheels attack scale simultaneously in three different sections of the tube.

TANGOL. The new vegetable glue, brought on the American market by the Arabol Manufacturing Company, New York, is absolutely pure and neutral and its solution will keep in condition for weeks without the use of preservatives. It leaves no odor. Its thickening qualities are equal to those of gum tragacanth. It make a thick paste at the rate of one pound to four or five gallons of water.

THE STANDARD PAINT COMPANY, 100 William St., New York. Those interested in roofing would find ito to their interest to write to this company for its literature on this subject, particularly for its illustrated booklet on "Ruberoid."

CASSELLA COLOR COMPANY, New York. This company has issued during the past month two color cards, one referring to its Diamine Fast Black X N extra conc., which, compared with the ordinary direct dyeing cotton blacks, offers the great advantage of possessing a much finer shade and better fastness to light. The new dyestuff is interesting for all the different branches of cotton dyeing, and is of the greatest importance in the dyeing of artificial silk. Another color card of this company's is that relating to Immedial Direct Blue 4B extra conc., and BB extra conc. These are two new products of the Immedial Direct Blue series, and are distinguished for their special brightness of shade and possess excellent levelling properties and those of fastness. These new dyes are of importance for the production of indigo-like blue shades in all branches of cotton dyeing, and are particularly well suited for machine dyeing.

FRANK MOSSBERG CO., Attleboro, Mass. This company issues an attractive catalogue relating to its manufacture of metal spools, steel reels, steel beams, jack spools, etc. We may note in particular among the products of the company a reel for holding and delivering wire to automatic wire bending machines and power presses; stamped steel beams which are used in the textile field very widely in place of cast iron beams because of their indestructibility, stiffness, light weight and moderate cost; stamped steel jack and dresser spools, which are something new with stamped steel heads with wooden or steel barrel, the heads being constructed with radial ribs, firmly bolted to a metal barrel.

H. E. STAFFORD, Providence, R. I. Mr. Stafford has recently issued an attractive little book entitled "The Drop Wire," specially referring to the electrical warp-stop motion made by the Coldwell-Gildard Co., Fall River, Mass. The object of the booklet is to show the necessity of this device to the loom.

THE CONNECTICUT MILL SUPPLY COMPANY, Torrington, Conn. This company is placing before the trade a steel spinning ring made by a patented process consisting of folding a double flange spinning ring from sheet steel. This, together with a special hardening furnace designed for this purpose and a new method of polishing, enables the company to make claims for its rings that they are harder, rounder and smoother, and with qualities that will enable it to start better, wear longer, and cost less than the regular turned rings. This ring is already in use in a number of the largest mills of this country. It can be furnished with or without holders. The company is desirous to prove the foregoing claims and ask manufacturers to give the ring a trial by equipping one of their frames and watch the result.

W. J. A. LONDON has recently accepted the position of chief engineer of the Terry Steam Turbine Company, Hartford, Conn., succeeding C. E. Terry, recently deceased.

THE R. D. NUTTALL COMPANY, of Pittsburg, Pa., announces the establishment of a new department to be devoted exclusively to the manufacture of gears and pinions for air compressors.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO. The offices and works of The Hadaway Electric Heating & Engineering Company, which was some time since acquired by the Westinghouse Electric & Manufacturing Company, have been removed from 238 West Broadway, New York, to the works of the electric company at East Pittsburg, Pa.

Inquiries about anything pertaining to the textile business will be cheerfully answered by COTTON.

New York Silk Conditioning Works. 138-142 Spring St., New York. This firm issue a book, that should be appreciated by every textile manufacturer, entitled "Tables of Equivalents and Yarn Tables." These tables are intended for use in the textile and dyeing industries, and can be relied upon as authentic. The tables in their present form are of great practical value to those making calculations for their own use, or wish to keep abreast of European progress in handling textile fibers. As competition constantly becomes keener in the American textile industries the surpassing importance of accurate calculation is daily being impressed upon our manufacturers. The price of this pamphlet is 50 cents.

Philadelphia Textile School, Philadelphia The catalogue of this school for 1908-1909 has just been received, furnishing all necessary information concerning the instructions given in textile manufacturing. This school has regular courses for day and evening students in cotton, wool and silk manufacture, teaching all processes employed in mill practice, including chemistry, dyeing and printing.

Textile School at the A. & M. College, West Raleigh, N. C.—We have received from this school, in pamphlet form, its courses of instruction in textile arts, covering periods of ten weeks, of four years, and special periods to satisfy certain wants of students. The four years' course covers all the subjects taught in the department, and leads to the degree of bachelor of engineering in textile industry. This course combines with the textile instruction certain practical and theoretical subjects which enable the student to understand better his special work. The National Association of Cotton Manufacturers awarded this year a medal to the school to be presented to the most proficient student in the textile course. At the graduating exercises held last May this medal was awarded to Maurice Hendrick of Shelby, N. C.

Lowell Textile School, Lowell, Mass. The 1908-09 bulletin of this school has come to hand, handsomely bound and illustrated, giving full information concerning the school, including the courses for day and evening students in cotton and wool manufacturing, also in textile designing, chemistry and dyeing, and in textile engineering. The growth of this school has been constant from the beginning in 1897. January 1, 1908, the roster showed 129 day and 483 evening pupils, or 612 in all.

Farbenfabriken of Elberfeld Company, New York. This company has issued a color card relating to its Fast Light Yellow RG, being an additional brand to its well known Fast Light Yellows, but producing somewhat redder shades than Fast Light Yellow G, which is the oldest brand of this category. This new dye will come in very useful for producing olives, browns and other dark shades required to be fast to light.

S. Morgan Smith Company, York, Pa. Bulletin No. 100 issued by this company is descriptive of the Smith turbine. This company intends to issue bulletins from time to time, showing the various types and designs of turbines manufactured by it, all of which will contain data that will be of great value to purchasers and users of hydraulic turbines. We would suggest to those who are interested in this means of power to write to this company for its bulletins.

Howard & Bullough, American Machine Company, Pawtucket, R. I. Repeat orders have been placed with this company by the Swift Mfg. Company, Columbus, Ga., for revolving flat cards; by the Borden Mfg. Co., Goldsboro, N. C., for revolving flat cards, drawing frames, and spinning frames; and by the Great Falls Mfg. Co., Rockingham, N. C., for revolving flat cards, drawing frames, speeders, and spinning frames.

H. A. Metz & Co., New York City. Vol. 10, 1908, of the "Year Book" for colorists and buyers has recently been issued by H. A. Metz, and sent to the trade with the compliments of the firm. This volume is as interesting as former ones, relating specifically to the identification of dyestuffs, patents for the year 1907, notes on processes, new colors, etc., with a list of dyestuffs, makers and methods.

The Blakely Bobbin Co., Blakely, Ga. This company is running on full time and turning out a nice class of work with which its customers are well pleased. The company is very much encouraged, so far, with its venture. This company's new mill has been the means of stimulating manufacturing enterprises in this place, and the people have decided to build a large cotton mill, the promoters of which are very enthusiastic over the prospect. The following committees are in charge: Committee on Manufacturing, D. W. James, Chairman; J. R. Pottle, T. E. Boyett and J. C. Chancy. Committee on Machinery, J. H. Flowers, Chairman; T. R. McDonald, J. W. Griffin, and Jno, Underwood. Committee on Building, C. M. Deal, Chairman; W. H. Powell, C. F. Coleman, and W. W. Fleming.

Farbenfabriken of Elberfield Co., New York City. This company has issued a color card showing its Diazo Geranine B extra, being a new brand of its red diazo dyestuffs. This new color produces very clear pink shades as well as very dark reds fast to washing and cross dyeing. It can be employed for the dyeing of loose cotton, yarn, cops and piece goods. It will be found particularly useful for the dyeing of cotton material required to be fast to washing, such as blouses, tickings and dress goods, and for effects with cross dyeing.

Hardinge Bros., Chicago and New York City. This company manufactures a watchman's portable time detector, which has been approved and listed by the National Board of Fire Underwriters, each clock being inspected and labelled by the underwriters' laboratories before leaving the factory. The detective lock that goes with this clock makes it absolutely impossible for the watchman to open the clock without a record being made on the dial showing that it has been tampered with. Those interested in anything of this kind would do well to write to the company for its pamphlet relating to its manufacture.

Golden-Anderson Specialty Co., Pittsburg, Pa. This company has issued a number of leaflets and folders relating to its steam and water specialties, among which may be mentioned the "golden self-closing and tempering protective water gauge;" the "Gould safety continuous feed water regulator" for maintaining uniform water level in steam boilers, guaranteeing maximum boiler efficiency and